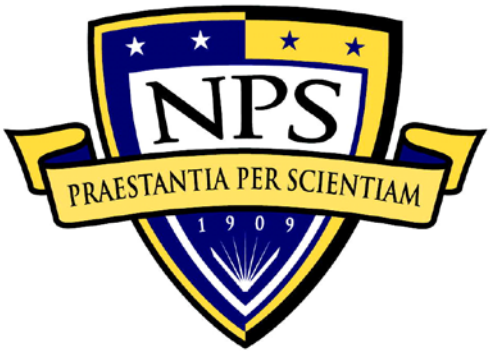

NAVAL POSTGRADUATE SCHOOL

MONTEREY, CALIFORNIA

THESIS

IMPROVING MARINE CORPS ASSIGNMENT OF SDAP LEVELS

by

Miguel Moreno

March 2013

Thesis Co-Advisors: Elda Pema
Chad W. Seagren

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The purpose of the Special Duty Assignment Pay (SDAP) program is to provide incentives to encourage highly qualified and capable Marine participants to fill demanding Special Duty Assignment (SDA) billets. The types of SDA billets include, but are not limited to, drill instructors, combat instructors, recruiters, career planners, marine security forces/embassy guards and senior enlisted advisors. SDAP compensation levels range from a minimum SDAP level 1 of $75 to a maximum SDAP level 6 of $450. Ensuring this program makes efficient use of its limited budget is even more critical in periods of fiscal uncertainty. This study employs Ordinary Least Squares and Fixed Effects multivariate regression models to examine the correlation between the quality of Marines serving in special duty assignment billets and SDAP levels. The quality of Marine participants has been determined not to be a current consideration in the process of assigning SDAP levels. The quality variables evaluated are GCT, meritorious promotion, proficiency and conduct markings, PFT and CFT. The results of the investigation also indicate which measure of quality is the best to include in the process of assigning SDAP.

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IMPROVING MARINE CORPS ASSIGNMENT OF SDAP LEVELS

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Submitted in partial fulfillment of the
requirements for the degree of

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from the

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ABSTRACT

The purpose of the Special Duty Assignment Pay (SDAP) program is to provide incentives to encourage highly qualified and capable Marine participants to fill demanding Special Duty Assignment (SDA) billets. The types of SDA billets include, but are not limited to, drill instructors, combat instructors, recruiters, career planners, marine security forces/embassy guards and senior enlisted advisors. SDAP compensation levels range from a minimum SDAP level 1 of $75 to a maximum SDAP level 6 of $450. Ensuring this program makes efficient use of its limited budget is even more critical in periods of fiscal uncertainty. This study employs Ordinary Least Squares and Fixed Effects multivariate regression models to examine the correlation between the quality of Marines serving in special duty assignment billets and SDAP levels. The quality of Marine participants has been determined not to be a current consideration in the process of assigning SDAP levels. The quality variables evaluated are GCT, meritorious promotion, proficiency and conduct markings, PFT and CFT. The results of the investigation also indicate which measure of quality is the best to include in the process of assigning SDAP.

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LIST OF ACRONYMS AND ABBREVIATIONS

AFQT	Armed Forces Qualification Test
AIP	Assignment Incentive Pay
AMOI	Assistant Marine Officer Instructors
AMOS	Additional Military Occupational Specialty
AR	Active Reserve
ASR	Assigned Staffing Report
ASVAB	Armed Services Vocational Aptitude Battery
BAH	Allowance for Housing
BMOS	Billet Military Occupational Specialty
CFT	Combat Fitness Test
CJSOTF	Combined Joint Special Operations Task Force
CMC	Commandant of the Marine Corps
CNA	Center for Naval Analysis
COLA	Cost of Living Allowance
CRS	Career Retention Specialist
CSO	Critical Skills Operators
CT	Counter-Terrorism
DA	Direct Action
DoD	Department of Defense
DODFMR	Department of Defense Financial Management Regulation
DoDI	DoD Instruction
FE	Fixed Effects
FID	Foreign Internal Defense
FMF	Fleet Marine Force
GCT	General Classification Test
HQMC	Headquarters Marine Corps
IO	Information Operations
JASS	Job Advertising and Selection System

M&RA	Manpower and Reserve Affairs
MARADMIN	Marine Administrative Message
MARSOC	Marine Corps Special Operations Command
MARSOF	Marine Special Operations Forces
MCO	Marine Corps Order
MCSF	Marine Corps Security Force
MCTFDW	Marine Corps Total Forces Data Warehouse
MEPS	Military Enlistment Processing Stations
MOS	Military Occupational Specialties
MPMC	Military Personnel, Marine Corps
MPO	Military Policy Office
MSG	Marine Security Guard
NBC	Nuclear, Biological, Chemical
OJT	On-the-Job Training
OLS	Ordinary Least Squares
PFT	Physical Fitness Test
PME	Professional Military Education
SDA	Special Duty Assignment
SDAP	Special Duty Assignment Pay
SEA	Senior Enlisted Advisors
SF	Security Force
SME	Subject Matter Expert
SMU	Special Mission Units
SR	Special Reconnaissance
TFDW	Total Force Data Warehouse
USSOCOM	United States Special Operations Command
UW	Unconventional Warfare

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I. INTRODUCTION

A. BACKGROUND

Special Duty Assignment Pay (SDAP) is incentive compensation designed to attract enlisted Marines to fill billets that the Marine Corps deems critical. Marines in these Special Duty Assignment (SDA) billets perform important tasks that are essential to the Marine Corps' mission to include recruiters, drill instructors, combat instructors, marine security guards, security forces, and several others billets.

Headquarters Marine Corps (HQMC) is interested in identifying objective and quantitative measures to improve the future determination of SDAP levels to SDA billets. One of the Marine Corps' most important questions is which assignments to designate for SDAP? This analysis does not specifically address how to determine the designation of the SDAP billets; however, the findings evaluate the current process and identify quantitative criteria to aid in that determination in the future. It is difficult to determine what SDAP level each SDA program should receive, especially since each program performs vastly different duties. The many differences in the billet responsibilities make it increasingly complicated to assess which billet is more difficult or demanding. These different objectives and missions associated with each SDA program make it hard to compare the SDA programs equally across similar measures when assigning SDAP levels.

B. PURPOSE

The purpose of this research is to evaluate the Marine Corps' criteria for assigning SDAP levels to identify objective methods to improve the assignment of these levels. This study uses data from the Marine Corps Total Force Data Warehouse (MCTFDW). The study considers whether including other criteria in the process of assigning SDAP levels can effectively incentivize participation. The additional criteria in the process will not only help assign the correct SDAP level to the most demanding billets but will also consider the SDA billets with low participation or high attrition, and low quality SDA

billets. The focus of this study revolves around the effect of SDAP on the quality of Marines in the program, on an individual level and by Billet Military Occupational Specialty (BMOS).

Many factors can influence a Marine's decision to volunteer for a SDA program, such as financial incentive, promotion opportunity, travel opportunity, and the desire for a challenging and rewarding career. A program's difficulty and level of responsibility also contribute to a Marine's decision to participate in a SDA program. While financial compensation is not the primary factor for SDA participation, it is important to attract the participation of high quality Marines, since the assignment of SDAP levels is associated with jobs possessing demanding duties and a high degree of responsibility. This investigation explores measures that can contribute to and improve the process of assigning SDAP and lead to a higher standard in determining SDA billet and program qualifications in the future.

With the current military downsizing and the recent economic recession, military spending, especially incentive compensation like SDAP will undergo increased scrutiny. To analyze the effectiveness of this SDAP program as an incentive tool, it is important to evaluate the true impact of the incentive on quality Marines who participate in SDAP programs with low participation rates or high attrition. This investigation measures the effect of SDAP on selected criteria using data collected from MCTFDW. The goal is to identify quantitative measures or criteria that can help improve the efficiency of SDAP spending. The findings will assist HQMC Manpower and Reserve Affairs (M&RA) and future working groups in more efficiently assigning SDAP levels to SDA billets or programs. Furthermore, it can lead to a more efficient way of determining qualifications for the SDAP programs.

C. PRIMARY RESEARCH QUESTIONS

1. Primary Questions

- Are the assignments of Marine Corps SDAP levels allocated for maximum efficiency?
- Should other criteria be included when assigning SDAP Levels?

- Do higher SDAP levels imply higher quality Marines in SDA billets?

2. Secondary Questions

- Does the current method of assigning SDAP levels effectively incentivize the SDA billets or programs that require it the most?
- Which SDA billets have a need for higher quality participation and should lower quality be used to determine assignment of SDAP levels?

D. SCOPE AND METHODOLOGY

While SDAP comprises a relatively small amount of the budget, it is important to the Marine Corps to allocate the incentive pay efficiently to induce quality participation across all SDAP billets or programs. The scope of the investigation includes evaluating the current process and revisiting the comprehensive review conducted by the HQMC M&RA, and the Military Policy Office (MPO) in 2010. The study compares the effect of SDAP levels on quality, using individual performance scores as proxies for quality. The comparison includes all Enlisted SDAP billets, and the associated SDAP levels. The goals are to identify criteria and develop a quantitative method for assigning SDAP levels from the data obtained from the Total Forces Data Warehouse (TFDW). The new criteria and methods must be reproducible and largely quantitative so the Marine Corps can objectively and accurately incentivize SDA billets with the optimal SDAP levels. This method will assist in qualifying future SDA programs, which seek SDAP consideration.

E. ORGANIZATION OF STUDY

Chapter II provides an overview of the directives, instructions, and regulations that govern the SDAP program. This chapter also reviews the details of the current process for assigning SDAP levels. In addition to the background information, this investigation also examines similar research studies to draw comparisons and identify criteria useful in improving SDAP level assignments. Chapter III explains the data used to conduct the investigation of the SDAP level assignments, as well describes and defines the variables used in the model. It also provides the descriptive statistics for the data used in the regression models, in addition to describing the methodology for the analysis. Chapter IV defines the regression model and discusses the model's specifications in

depth. This chapter also presents the results of the model and describes the outcomes. Chapter V summarizes the results of the investigation and makes recommendations for further research to improve the Marine Corps' process for assigning SDAP levels.

II. LITERATURE REVIEW AND BACKGROUND

A. INTRODUCTION

This chapter provides background information and guidance from defense instructions, regulations, and Marine Corps Orders on the SDAP program. It also reviews the current Marine Corps process for the assignment of SDAP levels. A thorough search of incentive pay studies yields no general or detailed analysis of the SDAP program as the focus of a research topic. This chapter provides a review of some similar studies related to incentive pay.

B. BACKGROUND

1. Overview of Special Duty Assignment Pay

SDAP is an incentive compensation payment for enlisted members serving in billets designated as SDA. The Department of Defense (DoD) and the concerned Secretary qualify service members for this entitlement when they perform duties designated as extremely difficult or involving an unusual degree of responsibility.[1] The Marine Corps assigns SDAP to eligible service members, SDAP levels range from 1 to 6

The authority to establish SDAP is given under Section 307 of title 37, of the United States Code. This authority is awarded and administered by the Department of Defense Instruction 1304.27, and further regulated by Department of Defense Financial Management Regulation (DODFMR) 7000.14R for all the services. Most of the SDA billets for the Marine Corps are assigned an Additional Military Occupational Specialty (AMOS). The Marine Corps AMOS billets are summarized in the Marine Corps MOS Manual, Marine Corps Order 1200.17. The Marine Corps awards and administers these billets under Special Duty Assignment Pay (SDAP) Program, Marine Corps Order 7220.12P.

[1] *Department of Defense Financial Management Regulation 7000.14R*, ch. 8, June 2008, 8–3.

2. Department of Defense Instruction 1304.27

On June 14, 1996, the DoD instruction was revised to include SDA pay. The military services refer to DoD policy reference (b) for special duty assignment pay. More specifically, the instruction states that when an enlisted member is assigned to duties designated as extremely difficult or involving an unusual degree of military skill, the member is entitled to compensation for that duty with a monthly payment in addition to any other pay and allowances. The instruction further states: "[t]he Military Services shall designate military specialties and assignments eligible for SDAP."[2]

3. Department of Defense Financial Management Regulation 7000.14R, Volume 7

The DODFMR provide guidance concerning the SDAP as an entitlement. Generally speaking, enlisted members entitled to basic pay may also qualify for SDAP when they perform duties designated by the branch or service Secretary as extremely difficult or involving an unusual degree of responsibility. A member who receives SDAP will receive the pay in addition to any other entitled pay or allowances. For SDAP levels, each military service will award this pay according to their applicable regulations.[3] Certification is also required. The certification authority is designated as low as the Commanding Officer of O-5 grade who conducts an annual review of the eligibility and payment authority for each member receiving SDAP. If positive SDAP certification of a member's eligibility for SDAP is not made, it will be stopped on the annual anniversary date.[4]

SDAP levels for the following specialties are established by the Office of the Under Secretary of Defense (Personnel and Readiness): Production Recruiter: SD-6; White House Communications Agency: SD-2 through SD-5, depending on position; Defense Threat Reduction Agency: specified positions, SD-2; Defense Courier Operations: specified positions, SD-1, and Senior Enlisted Advisor (SEA) to the Joint

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[2] *Department of Defense Instruction 1304.27*, April 10, 2009, 5.

[3] *DoD 7000.14-R Financial Management Regulation*, vol. 7A, ch. 08, 8–3.

[4] Ibid.

Chiefs of Staff based on the parent service's SDAP rate for individuals serving as SEA to the Service Chief, not to exceed SD-6.

The DoD instruction states that the monthly amount awarded for the SDAP levels 1 through 6 cannot exceed the maximum allowed of $600 under section 307 of the U.S. Code.[5] Table 1 lists the DODFMR Special Duty Assignment Monthly Rate.

SDAP Levels	Amount Paid to Members Monthly
SDAP-1	$75
SDAP-2	$150
SDAP-3	$225
SDAP-4	$300
SDAP-5	$375
SDAP-6	$450

Table 1. Special Duty Assignment Pay Levels and Monthly Amounts[6]

4. Marine Corps Order 7220.12P

In addition to restating the required criteria for the eligibility of SDAP, Marine Corps Order 7220.12P specifies the current Marine Corps billets eligible for SDAP. The designated SDAP billets are as follows.

- Sergeant Major of the Marine Corps. The Marine serving in this billet are authorized SD-6.
- Slated Sergeants Major/Master Gunnery Sergeants. These Marines are authorized SDAP based on the structured grade as follows: Gen/LtGen: SD-4. MajGen/BGen/SES: SD-3.
- Sergeants Major serving on recruiting duty. SDAP levels are as follows: Recruiter's School and Recruiting Station: SD-4. Marine Corps Recruiting District: SD-3. Marine Corps Recruiting Command: SD-2.
- Sergeants Major and First Sergeants serving on drill instructor duty. SDAP levels are as follows: First Sergeants-Recruit Company, OCS Letter Company and Drill Instructor School: SD-4. Sergeants Major—Recruit Training Regiment and Recruit Battalion: SD-3. Sergeants Major—MCRD and OCS: SD-2.

[5] *Department of Defense Instruction 1304.27*, 6.

[6] *DoD 7000.14-R Financial Management Regulation*, 8–4.

- Sergeants Major and First Sergeants serving on Marine Combat Instructor duty. SDAP levels are as follows: First Sergeants—Infantry Training Battalion (Headquarters & Instructor Company and Letter Companies), Advanced Infantry Training Battalion (Infantry Unit Leaders Training Company, Advanced Infantry Training Company, Reconnaissance Training Company and Light Armored Vehicle Company); and Marine Combat Training Battalion (Headquarters and Instructor Company, Headquarters & Support Company and Letter Companies): SD-3. Sergeants Major—Infantry Training Battalion, Advanced Infantry Training Battalion and Marine Combat Training: SD-2. Sergeant Major—School of Infantry: SD-1. First Sergeant—Headquarters and Service Battalion (Student Administration Company): SD-1.

- Sergeants Major. These Marines serving on special duty assignment are only authorized one monthly payment of SDAP. In every situation in which different levels of SDAP are authorized, the higher value of SDAP will be paid.

- Recruiters. Marines, including Active Reserve (AR) Marines, who have an additional Military Occupational Specialty (MOS) of 8411 or primary MOS of 8412 and perform the duties in an authorized 8411/8412 billet, are eligible for SDAP. The SDAP award level for recruiters is SD-6.

- Career Planner/Career Retention Specialist (CRS). Career Planners/CRSs, including AR Marines, who have a primary MOS of 0143, and are filling an authorized 0143 billet, are authorized SD-2.

- Drill Instructors. Marines who possess an additional MOS of 0911 and are assigned and performing the requisite duties in an authorized billet as a 0911 at MCRD, OCS Quantico, VA or OCS Navy Air Station (NAS) Pensacola, FL, are authorized SD-5. Assistant Marine Officer Instructors (AMOI)/Senior Enlisted Advisors (SEA) serving at the Naval Academy, Merchant Marine Academy, universities, colleges, or any type of prep school are not authorized SDAP unless assigned as a summer augment serving at OCS and filling an authorized 0911 billet. Payment of SDAP made to AMOIs is only for those periods of augmentation and nothing more. Periods of OCS augmentation begin upon reporting to OCS and end when the period of temporary duty has ended. AMOIs temporarily filling 0911 billets are authorized SDAP.

- Marine Combat Instructor. Marines who possess the additional MOS of 8513 or 0913 and are filling an authorized Marine Combat Instructor billet at the Schools of Infantry are authorized SD-3.

- Marine Security Guard (MSG). Marines who possess the additional MOS of 8156 and are assigned to a billet MOS of 8156 within the Marine Embassy Security Command are authorized SD-2. First Sergeants of Letter Companies within MSG Battalion are authorized SD-1.

- Helicopter Rescue Swimmers. SDAs for helicopter rescue swimmers are authorized at MCAS Cherry Point. The air station is authorized to award SD-3 to no more than six swimmers. Personnel must have completed the Rescue Swimmer School at Naval Aviation Schools Command, Pensacola, FL. Helicopter rescue swimmer assignments are voluntary in nature and are not reflected on any unit's table of organization. Additionally, the skill is not designated by a secondary MOS.
- Joint Assignments. The Deputy Assistant Secretary of Defense for Military Personnel Policy (Compensation) establishes SDAP levels for joint billets to maintain equity across the services. SDAP is authorized based on this schedule and may adjust periodically. SDAP rates will be published annually by Marine Administrative Message (MARADMIN). Marines assigned to Special Mission Units (SMU) will be authorized corresponding rates associated with other services assigned to similar billets within the SMU.
- Marine Corps Special Operations Command (MARSOC). Marines serving in designated operator billets and operator support billets are authorized SDAP. Designated billets and associated SDAP levels are periodically updated via MARADMIN. MARSOC commanders are not authorized to designate new billets as eligible for SDAP. The authority to designate new SDAP billets is not delegated below the DC M&RA level.[7]

5. Special Duty Assignment Billets in the Marine Corps, MCO 1200.17

Marine Corps order 1200.17 is the MOS manual. It contains a brief description for the duties of all MOSs including SDA billets with the respective AMOS that are typically the BMOS for SDA billets.

a. Sergeants Major 8999

Sergeants Major 8999 are Marines slated to serve as Senior Enlisted Advisors with General Officers or in a designated SDA billet. Duties include the following.

- Assist the commander as the senior enlisted Marine in the unit
- Act as the principal enlisted assistant to the commander
- Keep apprised of all policies of the commander
- Disseminate information to the unit's enlisted personnel regarding such policies

[7] *Marine Corps Order 7220.12P, Special Duty Assignment Pay Program*, May 21, 2008, 2–6.

- Report to the commander on the status of matters pertaining to the efficient operation of the command
- Counsel subordinate unit noncommissioned officers as required to improve the general effectiveness of the command
- Interview and counsel enlisted personnel on pertinent professional and personal matters that may affect the efficiency of the command
- Assists the commander in the conduct of office hours, requests mast, and meritorious mast
- Participates in ceremonies, briefings, confer commander
- Assist in the supervision of clerical and administrative matters, training functions, and the employment of the command in garrison and in the field, in addition to Logistic functions, such as billeting, transportation and messing, inspections and investigations, personnel management, and daily routine
- Assume other duties designated by the commander.

b. Sergeants Major of the Marine Corps 8991

The Sergeant Major of the Marine Corps assists the Commandant of the Marine Corps (CMC) as the senior enlisted Marine in the Marine Corps, advises the CMC in matters pertaining to enlisted personnel, and assists the CMC in the performance of his duties. They also perform such specific duties as being a member of the CMC's enlisted performance board, a member of the permanent Marine Corps uniform board, and a member of the CMC's party on all visits and inspection trips to Marine Corps installations when enlisted personnel are involved. In addition, when directed by the CMC, assist staff agencies in matters pertaining to enlisted Marines, and also represent the CMC at the staff noncommissioned officers' symposium.

c. Recruiters 8411

Recruiters must be thoroughly familiar with the enlistment process from applicant prospecting, to preparation for recruit training. Recruiters work in an environment external to the normal Marine Corps post, station, and Fleet Marine Force (FMF) environments. Typical functions of the recruiter include preliminary screening and administrative processing, scheduling physical examinations, completion of enlistment documents, and maintaining accurate records. Recruiters also provide the community

with Marine Corps publicity material and assist in civic events. Recruiters are stationed at recruit depots, recruiting stations, Military Enlistment Processing Stations (MEPS), and recruiting substations throughout the United States (U.S.) and some overseas locations.

d. Career Recruiters 8421

Career recruiters are superior recruiters who serve to establish a cadre of professional recruiters with long-term assignments in key managerial billets to improve the management and effectiveness of the recruiting effort. These billets include noncommissioned officer in charge, instructor, operations chief, contact team member, and liaison billets. It is possible for selected recruiters to spend most of their career in the recruiting service. Career recruiters can anticipate a minimum three-year tour in key recruiting billets and should anticipate transfer to another key billet upon the completion of a three-year tour. Assignment of career recruiters is determined by the needs of the recruiting service and the personal desires of the individual concerned.

e. Drill Instructors 0911

Drill instructors supervise and instruct entry-level recruits. They carry the task of molding and shaping the minds and bodies of young recruits into Marines. Drill instructor must possess a high degree of maturity, leadership, judgment and professionalism. Drill instructors are mentors to every recruit and must provide an example for them to emulate. Furthermore, drill instructors must thoroughly embrace the Marine Corps core values.

f. Marine Combat Instructors 0913

The Marine combat instructor instructs and assists in the training of basic combat skills to entry level Marines to include weapons handling, automatic weapons, munitions, combat conditioning, land navigation, communications, Nuclear, Biological, Chemical (NBC) protection, offensive/defensive tactics, and scouting/patrolling. The Marine combat instructor reinforces core values instilled in recruit training by setting the superior example with professional conduct, knowledge, bearing and attitude, provides

student performance counseling, assists in the conduct of parades and ceremonies, and maintains records and prepares reports.

g. Career Planners 4821

The career planner must be thoroughly familiar with the reenlistment process from prospecting to reenlistment ceremonies. And work within Marine Corps units, primarily as the Commander's advisor for enlisted retention matters. Typical functions of a career planner include preliminary screening and administrative processing, scheduling and conducting interviews, completion of reenlistment/lateral move/extension documents, and maintaining accurate records. The planner also provides Marine Corps units with basic individual career counseling, and fundamental Manpower Professional Military Education (PME) and briefings.

h. Marine Security Forces 8152, and Marine Security Guards 8156

The Marine Corps Security Force (MCSF) guard is assigned to duty with MCSF units. Marines must be physically fit and mentally capable of enduring the rigors of combat. Security Force (SF) Marines must have the requisite knowledge to employ the service rifle, pistol, and shotgun safely and properly. As a member of a reaction force, the Marine will conduct offensive infantry tactics in confined spaces, ashore and afloat, to restore breached security, and also provide the final barrier/element of an integrated security plan for the asset being protected. Marines also must possess skills in land navigation and patrolling. In the grades of Corporal through Gunnery Sergeant, as a security supervisor, the Marine will plan, evaluate, and supervise the implementation of site-specific security plans to protect assets designated as vital to the national security. The Marine Security Guard (MSG) will be assigned to duty to one of 140 plus MSG detachments around the world. The MSG will provide armed internal security to designated U.S. diplomatic and consular facilities to prevent the compromise of classified information and equipment vital to the national security of the Unites States. As part of the MSG detachment, the detachment member's secondary mission is to provide protection for U.S. citizens and U.S. government property located within designated U.S. diplomatic and consular premises during exigent circumstances, which require immediate

aid or action. The detachment member will be physically and mentally capable of enduring a direct counter-intelligence and combat environment, master interior guard procedures, and also, must be proficient with security, antiterrorism, and counter espionage tactics. The MSG member must also be knowledgeable in law enforcement techniques, small arms handling and employment, emergency first aide, force continuum, less than lethal application, and entry and access control procedures.

i. Critical Skills Operators 0371 (CSO/DCS)

Critical Skills Operators (CSO) are Marines trained to execute missions in the special operations core tasks of Foreign Internal Defense (FID), Direct Action (DA), Special Reconnaissance (SR) and Counter-Terrorism (CT), the secondary core task of Information Operations (IO), and tasks in support of Unconventional Warfare (UW) as part of the Marine Corps component to United States Special Operations Command (USSOCOM). CSO Marines are team oriented, but are trained and ready to function as individuals and as members of an element, team, company, battalion, or regiment. They are capable of operations across the entire spectrum of special operations, from employment in isolated and austere locales with little-to-no conventional support to operations as fully integrated units in a Combined Joint Special Operations Task Force (CJSOTF) or other joint task organized configurations. To facilitate in these operations, CSOs are also intensively trained as a Subject Matter Expert (SME) in advanced communications, engineering, special weapons, intelligence, and advanced special operations, depending on their billet in the MSOT. CSOs operate as cross-cultural diplomats and global scouts, with the unique ability to exert influence in areas and situations absent authority. They may also possess advanced language capabilities and cultural familiarity, and are adept at working by, with, and through partner nation forces in pursuit of strategic goals and objectives. CSOs possess a naval expeditionary character, and as such, provide maximum versatility for geographical combatant commanders. Marine Special Operations Forces (MARSOF) Marines are capable of rapid integration and interoperability with the joint force.[8]

[8] *Marine Corps Order 1200.17, Military Occupational Specialty Manual*, May 23, 2008.

C. CURRENT SDAP LEVELS ASSIGNMENT PROCESS

Major A. Hargis prepared an information paper that provides understanding over the purpose, history, and growth of the SDAP program. SDAP is intended to incentivize enlisted Marines to qualify for and serve in designated SDA billets. While spillover effects into retention occur, SDAP was not intended as a retention pay.[9]

In 1958, the Proficiency Pay Program was implemented, under the authority of the Uniformed Services Pay Act of 1958, with two different types of entitlements. The first is Shortage Specialty Proficiency Pay, which is designed to retain personnel serving in critical military skill specialties experiencing retention problems. The second is Special Duty Assignment Pay, which is designed to encourage qualified personnel to undertake duties, outside their normal career fields that require volunteers and for which a manning shortage exists.[10]

In 1984, SDAP replaced the Proficiency Pay Program. SDAP was designed to pay enlisted members who are required to perform extremely demanding duties or duties demanding an unusual degree of responsibility. The Marine Corps awards SDAP to seven principle programs: senior enlisted advisors, recruiters, drill instructors, career retention specialists, marine security guards, special operators, and marine combat instructors. The Office of the Secretary of Defense controls five special duty assignment programs: production recruiters, White House communications agency, defense threat reduction agency, defense courier operations, and the senior enlisted advisor to the Chairman of the Joint Chiefs of Staff.[11]

SDAP is often misconceived as a compensatory allowance for out-of-pocket expenses incurred while on independent duty for items, such as dry cleaning, meal, travel, fuel, parking, and housing expenses. Out-of-pocket expenses in conjunction with the performance of duties are normally covered through TAD funds, COLA, BAH, and BAS, but not SDAP.

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[9] Information Paper, SDAP, A. Hargis, Major USMC, March 9, 2010.

[10] SDAP Media PPT, A. Hargis, Major USMC, slide 10, March 2010.

[11] Information Paper, SDAP.

This misconception sometime leads to requests, by other groups of Marines, for SDAP designation to be expanded to include other assignments. The cost of the SDAP program is not the greatest concern, but it is always considered because SDAP dollars must be spent wisely and be focused on the Marine Corps' most critical staffing needs. This program is funded out of Military Personnel, Marine Corps (MPMC) budget, special pay category. In other words, the program is a discretionary pay and not an entitlement, which means it can be turned on and off, by proper authority, as needed.

In 2010, the Marine Corps conducted its third comprehensive review of the SDAP program. The program had been reviewed twice in 14 years prior to 2010, while the other services review their programs every two years. The Marine Corps SDAP program has increased 41 percent in participation, from 6,000 to 8,500 from FY2001 to FY2009, and the cost has increased from $20 million to $30 million in the same time frame. The cost has increased 165 percent in the past 15 years.

The SDAP program is a compensation tool designed to help shape the force to satisfy mission requirements. The program must be reviewed periodically to verify that validity of the designated SDA billets and the additional pay is still warranted.[12]

On March 26, 2010, a working group at HQMC was convened for the purpose of completely reviewing the SDAP program. The primary criteria used for determining the SDAP levels are qualitative with the exception of being screened and school trained. The specific criteria used for this review of the SDAP program are as follows.

- Be extremely demanding duty: Duties are considered extremely demanding if they require an extraordinary personal effort to ensure successful mission accomplishment
- Require an unusual degree of responsibility: Duties are considered to have an unusual degree of responsibility when a heavy personal burden is placed upon the Marine over and above what would reasonably be expected in a military assignment for a member's grade and experience
- Requires special qualifications met through screening and special schooling: On-the-job training (OJT) is fine, but the duration and curriculum of OJT must be similar to the formal school training associated with the SDA MOS and must fully qualify the Marine to serve in the SDA

[12] Information Paper, SDAP.

The members of the working group were provided a brief of the SDAP program and were given an Assessment Sheet, as shown in Appendix A,[13] to evaluate the SDA billets being reviewed by the working group. The Assessment Sheet asks the working group members to rate the SDA program on, how challenging the SDA program is? On a scale from 1 to 10, 1 is challenging and 10 is extremely challenging. The next Question asks the working group member to give an initial assessment of the pay level the program should receive, by circling 1 for $75, 2 for $150, 3 for $225, 4 for $300, 5 for 375 and 6 for $450. These are the only questions asked on the assessment worksheet. The criteria listed above, used to determine the assignment of SDAP levels, can have varying interpretation, which depends on the discretion, judgment, and experience of the working group members. This method for assigning SDAP levels is subjective and does not demonstrate the most efficient use of SDAP dollars. The most recent review of the assignment of SDAP levels completed in 2010, did result in some changes to the assignment of SDAP levels. The review did not completely remove any SDAP assignments but did lower the SDAP level for at least one program. The Career Planner program now receives SDAP level 1 versus the SDAP level 2 it had previously received. [14] The review was also one of three major reviews done over a 15-year span.[15]

D. EVALUATION OF THE ASSIGNMENT INCENTIVE PAY (AIP) SYSTEM

Golfin, Lien, and Gregory, in June 2004, conducted a study entitled "Evaluation of AIP." In this study, Golfin, Lein and Gregory evaluate the effectiveness of AIP with overseas Navy shore billets. Shore billets are similar to SDAP billets in that they are static or typically non-deployable. The study covered a wide range of factors surrounding AIP; for instance, the potential cost saving from increasing AIP versus offering sea duty credits, and the possible retention savings from increasing the rate of volunteerism for the AIP designated jobs. It also explores new areas, such as the difficulty in attracting bids

[13] SDA Challenge Assessment Worksheet, May 5, 2010, Appendix.

[14] Decision Package for the 2010 Review of USMC SDAP Program, September 21, 2010, A. Hargis, Major, USMC, J. Nettles, Colonel, USMC, M&RA (MPO).

[15] Information Paper SDAP.

for a job or being able to fill the position at all, in addition to the potential to offer lump sum payments of AIP up front versus monthly payments to result in cost savings.

In general, AIP functions in the following manner. After AIP levels are set by a market-based system, sailors must submit the desired amount of pay they are willing accept to fill an assignment in a location not considered ideal. Along with their bids, sailors have to provide their applications and application preferences in the Job Advertising and Selection System (JASS). The bids are only constrained by caps set by the Navy for each AIP location. Along with varying by location, the caps vary by pay grade, and some even in rating. The JASS cycle is approximately two weeks long, and once the cycle is complete, the detailers review all the qualified applicants for each billet and select the Sailors with the lowest bids and assign. The Sailors selected will receive their requested monthly AIP once they arrive at their new assignment.[16] Some of the factors used in the AIP bidding process can be useful to evaluate criteria in SDAP level assignments now and in the future, such as incentivizing high quality eligible service members and including participation rates or attrition rates to help set SDAP levels, and possibly, increasing the current SDAP levels to influence participation and truly make it an incentive.

E. PERFORMANCE BASED PAY FOR THE U.S. MARINE CORPS

Brown and Owen's project explore incentive pay from a civilian performance based pay method. The project consider how including the element of Performance based pay to the Marine Corps' pay system might improve productivity as a whole. The idea is to reward individual performance to incentivize Marines who might not be working to their full potential. The project explores incentive pay; however, it looks at changing the current pay system and the Marine Corps culture by introducing a civilian type pay system that is vastly different from analyzing the current SDAP program and improving the programs usefulness.[17]

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[16] Peggy Golfin, Diana Lien, and Dave Gregory, "Evaluation of the Assignment Incentive Pay (AIP) System," *Center for Naval Analyses, CAB* (June 2004): 1.

[17] Henry Brown and Owen Nucci, "Performance Based Pay for the U.S. Marine Corps" (MBA Professional Report, Naval Postgraduate School, 2005), 12.

F. AN ANALYSIS OF THE MARINE CORPS ENLISTMENT BONUS PROGRAM

Ramsey's thesis focuses on enlistment bonuses as incentives to increase accessions in critically short enlisted program reviewing previous studies methodologies, elasticity models and multiple regression analysis to explore ways of creating an optimization model for enlisted bonus program (EBP). This study focuses on enlisted incentives and provides a qualitative analysis of theoretical solutions for future EBP. This differs from the analysis on quantitative measure of improving the assignment of SDAP levels. However, it does state that historical data can be useful in estimating optimal enlisted bonuses.[18]

G. MONETARY INCENTIVES FOR MARINE RECRUITERS

While Loving's study is dated, it is very relevant to SDAP. The study focuses on the unexplored, at the time, use of incentives as a means of increasing recruiter productivity. During that time, the Marines only provided incentives to top-performing recruiters. It did do much to incentives all recruiters to strive continually to increase productivity. The study established belief that a properly designed monetary incentive program could effectively fill the Marine Corps incentive void and would ensure meeting future recruiting goals.[19] This study provides several positive tools to address the current improvements suggested in this investigation for SDAP. A survey, similar to the one in this study, will provide insight and data to analyze Marines' opinion on SDAP. Produce a daily incentive within the current SDAP incentive program that targets all SDAP programs for the duration of their tours and inspires Marines to greater levels of productivity. It would be ideal to be able to establish performance based criteria that allow Marines to achieve higher SDAP levels within a program. For example, Combat Instructors are qualified platform instructors shortly after graduating CI school; however, they can obtain a Master Instructor qualification through the completion of a specified

[18] Billy H. Ramsey, "An Analysis of the Marine Corps Enlistment Bonus Program" (master's thesis, Naval Postgraduate School, 2008).

[19] James B. Loving, "Monetary Incentives for Marine Recruiters" (master's thesis, Marine Corps Command and Staff College, 2001), 12.

curriculum. Similar to Recruiters in the study, Combat Instructor and all SDAP billets can establish or define measures that demonstrate greater productivity within the respective programs.

H. CHAPTER SUMMARY

This chapter explains the eligibility criteria for SDA billets, as well as how the Marine Corps and DoD regulate and administer the SDA billets and SDAP. Descriptions from the MOS Manual for nine of the SDA billets provide some insight as to the range of responsibility and the varying differences among the SDA billets. An overview of the current process for assigning SDAP levels, with the specific criteria used for the process. The chapter also provides reviews of similar studies on incentive pay compensation. Some which parallels the importance of quality, participation rates, incentive pay caps, and provides insight into other potential methods for improving SDAP level assignments.

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III. DATA AND METHODOLOGY

A. INTRODUCTION

This chapter discusses the data used in the investigation and analysis on assigning SDAP in the Marine Corps. It discusses the data collection process and provides a short summary of the descriptive statistics. The methods used to analyze the criteria will indicate their correlation with SDAP levels. The analysis of the data collected helps identify attributes that may lead to an improved model for assigning SDAP levels across all SDA billets.

B. DATA COLLECTION

The data in this study is from the MCTFDW. The data set captured all enlisted Marines who received SDAP during the eight fiscal years ranging from October 1, 2005 to September 30, 2012. The data set includes the six levels of SDAP that correspond to a monthly dollar amount. The data set also includes every BMOS, which help identify the SDAP program in which a Marine participated.

C. DATA SUMMARY

The study analyzes the data file from TFDW using the statistical software STATA. The original file consisted of 67,306 observations. Observations with an AFQT scores below 30 are erroneous and are not present in the final data set.[20] Once clean and free of missing or clearly erroneous entries, the final data set includes 64,538 observations.

Table 1 provides the data description for the variables created and used to estimate the regression models. Using information from the BMOS codes, the author creates seven major BMOS categories: *Career Planner, Drill Instructor, Combat Instructor, Recruiter, Marine Security Guards, Senior Enlisted Advisor,* and *Other MOSs*. The *GCT, Meritorious Promotion, Proficiency, Conduct,* Physical Fitness Test (*PFT*) and

[20] The Marine Corps minimum AFQT is 31 for high school graduates and 50 for Marines with a GED.

Combat Fitness Test (*CFT*) variables are also clean and serve as dependent "quality" variables. The remaining variables represent independent variables.

Variable	**Description**
AFQT	= 31 thru 99
GCT	= 40 thru 153
PFT	= 101 thru 300
CFT	= 151 thru 300
Proficiency	= 1.9 thru 5
Conduct	= 1.9 thru 5
Female	= 1 if gender is F
Native	= 1 if race_1 is American Indian/Alaskan Native
Asian	= 1 if race_1 is Asian
Black	= 1 if race_1 is Black or African American
Pacific Islander	= 1 if race_1 is Native Hawaiian or Other Pacific Islander
White	= 1 if race_1 is white
Hispanic	= 1 if ethnicity is Latin American/Mexican/OTHHSP/PR
Other race	= 1 if race_1 is otherrace
SDAP Level 1	= 1 if SDAP_Level is SDA PAY SD-1
SDAP Level 2	= 1 if SDAP_Level is SDA PAY SD-2
SDAP Level 3	= 1 if SDAP_Level is SDA PAY SD-3
SDAP Level 4	= 1 if SDAP_Level is SDA PAY SD-4
SDAP Level 5	= 1 if SDAP_Level is SDA PAY SD-5
SDAP Level 6	= 1 if SDAP_Level is SDA PAY SD-6
Less than High School	= 1 if civ_educ is 7th thru 11th grade
High School	= 1 if civ_educ is 12th grade
Some College	= 1 if civ_educ is 1 year thru 3 years of college
College Degree	= 1 if civ_edu is 4 years college
Graduate Degree	= 1 if civ_educ is Masters or higher
FY2005	= 1 if fy is 2005
FY2006	= 1 if fy is 2006
FY2007	= 1 if fy is 2007
FY2008	= 1 if fy is 2008
FY2009	= 1 if fy is 2009
FY2010	= 1 if fy is 2010
FY2011	= 1 if fy is 2011
FY2012	= 1 if fy is 2012
E-3	= 1 if grd is E3
E-4	= 1 if grd is E4
E-5	= 1 if grd is E5
E-6	= 1 if grd is E6

Variable	Description
AFQT	= 31 thru 99
GCT	= 40 thru 153
PFT	= 101 thru 300
CFT	= 151 thru 300
Proficiency	= 1.9 thru 5
Conduct	= 1.9 thru 5
E-7	= 1 if grd is E7
E-8	= 1 if grd is E8
E-9	= 1 if grd is E9
Meritorious Promotion	= 1 if promotion date occurred on 2nd day of the month
Career Planner	= 1 if BMOS_1 is 0143/4821
Drill Instructor	= 1 if BMOS_1 is 0911/8511
Combat Instructor	= 1 if BMOS_1 is 0913/8513
Recruiter	= 1 if BMOS_1 is 8411/8412
Marine Security Guards	= 1 if BMOS_1 is 8151/8152/8154/8156
Senior Enlisted Advisor	= 1 if BMOS_1 is 9999/8991/8999
All Others MOSs	= 1 if BMOS_1 is any other MOS

Table 2. Data Description

D. DATA DESCRIPTION

Descriptive statistics for all variables are shown in Table 2. The study uses the following variables as proxies for Marine quality, *GCT*, *Meritorious Promotion*, *Proficiency*, *Conduct*, *PFT*, and *CFT*. The *GCT* observations with a score of zero receive a label of missing and retained, and totaled 60,133 observations. The PFT score observations with a value of zero receive a code of missing. It is important to note that PFT scores were not available in the Marine Corps Total Forces System until 2010, which limits this PFT variable to 25,535 observations. The CFT score observations with a value of zero receive a code of missing. The CFT scores were also not available in the Marine Corps Total Forces System until 2009, which only provides 26,414 observations. The average proficiency and conduct marks for the data set are 4.5 and 4.5, respectively. These averages represent 64,267 observations for proficiency and conduct.

The female variable shows that less than 5 percent of Marines receiving SDAP are females. The race variable was broken down into six categories. The variables were created using both the race and ethnicity variables to account for observations that

contain “declined to respond” entries in one of the categories but not both. The Native variable comprises 1 percent of the observations. The Asian variable comprises just more than 2 percent of the observations. The Pacific Islander variable comprises less than 1 percent of the sample observations. The Black variable is one of the larger categories at 16 percent of the sample. The Hispanic variable is the second largest category at nearly 20 percent of the observations. The control group is white, and it comprises 57 percent of the population. The remaining observations in the race variable were coded as Other Race and accounted for 1,569 observations or 2.8 percent. All of the new race variables are mutually exclusive.

SDAP levels were divided into the six categories and are binary variables. The SDAP Level 1 variable comprises just fewer than 4 percent of the sample observations. The SDAP Level 2 variable comprises 20 percent of the sample observations. The SDAP Level 3 variable comprises 9 percent of the sample observation. The SDAP Level 4 variable comprises 1 percent of the sample observation. The SDAP Level 5 variable comprises 19 percent of the sample observations. The SDAP Level 6 variable comprises the largest portion of the SDAP Levels at 46 percent of the sample observations. Observations that did not fall under one of these six levels were dropped as erroneous, for a total of only 101 observations. The SDAP Level variable will identify the effect if any of SDAP levels on the quality of Marines.

Civilian education is used as a dependent variable. The civilian education variable is divided into five categories. The Less than High School variable comprises less than 1 percent of the observations. The High School variable is the largest of the education variables with 91 percent of the observation. The variable Some College comprises 6 percent of the observations. The College variable comprises 2 percent of the observations. The graduate degree variable comprises only 1 percent of the sample observations. Civilian Education variables will assist in determining the quality of Marines by BMOS and SDAP level.

The fiscal year variable was divided into eight dummy variables representing fiscal years 2005 through 2012, and comprises 10 percent for 2005, 11 percent for 2006,

12 percent for 2007, 13 percent for 2008, 2009 and 2010, and 14 percent for 2011 and 2012 of the observations, respectively.

The grade variable is broken out by pay grade. Observations with the pay grade below E-3 and above E-9 were dropped as erroneous[21] this only removed seven observations from the sample. The E-3 variable comprises 1 percent of the observations. The E-4 variable comprises 5 percent of the observations. The E-5 variable comprises 41 percent of the observations. The E-6 variable comprises 33 percent of the sample. The E-7 variable comprises 14 percent of the observations. The E-8 variable comprises less than 4 percent of the observations, and E-9 comprises just less than 2 percent of the observations. The variable for E-9 included the Sergeant Major of the Marine Corps. These variables will provide the grade distribution across SDAP levels and across BMOS programs.

The Meritorious Promotion variable can contribute to evaluating the quality of Marines across BMOS and SDAP Levels. The indicator for meritorious promotions is date of rank; this variable includes all Marines with a date of rank occurring on the 2nd day of a month.[22] The meritorious promotions account for less than 8 percent of the sample observations.

The BMOS variable contains 169 BMOS codes and was divided into seven primary groups. The Career Planner variable is comprised of the BMOS codes of 0143 and 4821[23] and is 3.5 percent of the sample observations. The Drill Instructor variable is comprised with BMOS of 0911 and 8511[24] and is 13 percent of the sample observations. The Combat Instructor variable is comprised of the BMOS codes of 0913 and 8513[25] and is less than 10 percent of the total sample observations. The Recruiter variable is

[21] SDAP is a monthly monetary incentive that is paid to enlisted members only, and to be eligible a Marines must be serving in the rank of Lance Corporal (E-3) or higher. MCO 7220.12P, 21 May 2008, pages 1 and 2

[22] Marine Corps meritorious promotions are always dated the 2nd day of the month, for the month of promotion.

[23] The Career Planner MOS code from 2006–2008 was 0143 and was changed to 4821 in 2009.

[24] The Drill Instructor MOS code from 2005–2006 was 8511 and was changed to 0911 in 2007.

[25] The Combat Instructor MOS code from 2005–2006 was 8513 and was changed to 0913 in 2007.

comprised of the BMOS codes 8411 and 8412 and is 46 percent of the sample observations. The Marine Security Guard variable was comprised of the BMOS codes of 8151, 8152, 8154 and 8156 and is 15 percent of the sample observations. The Senior Enlisted Advisor variable is comprised of 8999, 8991, and 8999 and is up less than 2 percent of the sample observations. These six primary BMOS groups comprise 86 percent of all the sample observations. The final variable in this category is the Other MOS variable and it is comprised of all the remaining BMOS codes and is just 11 percent of all observations.[26]

Variable	Freq of Obs	Mean	Std. Dev.
AFQT	64,538	59.377	17.270
GCT	60,133	107.382	11.426
PFT	25,535	255.539	31.336
CFT	26,414	284.899	14.518
Proficiency	64,267	4.552	0.113
Conduct	64,267	4.547	0.121
Female	3,050	0.047	0.212
Native	616	0.010	0.097
Asian	1,448	0.022	0.148
Black	10,600	0.164	0.371
Pacific Islander	536	0.008	0.091
White	37,197	0.576	0.494
Hispanic	12,572	0.195	0.396
Other race	1,569	0.028	0.165
SDAP Level 1	2,381	0.037	0.189
SDAP Level 2	13,074	0.203	0.402
SDAP Level 3	5,796	0.090	0.286
SDAP Level 4	879	0.014	0.116
SDAP Level 5	12,384	0.192	0.394
SDAP Level 6	30,024	0.465	0.499
Less than High School	455	0.007	0.084
High School	58,606	0.908	0.289
Some College	3,861	0.060	0.237
College Degree	1,481	0.023	0.150
Graduate Degree	135	0.002	0.046
FY2005	6,310	0.098	0.297
FY2006	7,085	0.110	0.313

[26] All MOS codes were verified with the Marie Corps MOS manual.

Variable	Freq of Obs	Mean	Std. Dev.
FY2007	7,837	0.121	0.327
FY2008	8,316	0.129	0.335
FY2009	8,476	0.131	0.338
FY2010	8,687	0.135	0.341
FY2011	8,911	0.138	0.345
FY2012	8,916	0.138	0.345
E-3	807	0.013	0.111
E-4	3,319	0.051	0.221
E-5	26,716	0.414	0.493
E-6	20,991	0.325	0.468
E-7	9,136	0.142	0.349
E-8	2,350	0.036	0.187
E-9	1,219	0.019	0.136
Meritorious Promotion	5,014	0.078	0.268
Career Planner	2,193	0.034	0.181
Drill Instructor	8,438	0.131	0.337
Combat Instructor	6,265	0.097	0.296
Recruiter	29,401	0.456	0.498
Marine Security Guards	9,628	0.149	0.356
Senior Enlisted Advisor	1,231	0.019	0.137
All Others MOSs	7,382	0.114	0.318
Observations	64,538		

Table 3. Descriptive Statistics

E. METHODOLOGY

The analysis will first estimate a baseline OLS model to analyze the effects of SDAP level on the quality of Marines. This model will identify the correlation between one of the quality variables (*GCT, Proficiency, Conduct, Meritorious Promotion, Physical Fitness Test,* and *Combat Fitness Test*), and the six different SDAP levels, along with a number of independent control variables

$$\text{OLS } \boldsymbol{Y} = \boldsymbol{\beta_0} + \boldsymbol{\beta_1 X_1} + \ldots + \boldsymbol{\beta_k X_k} + \boldsymbol{u}$$

where $\boldsymbol{Y}$ is the quality criteria (defined as *GCT, Meritorious Promotion, Proficiency, Conduct, PFT,* and *CFT*) of an individual Marine, where $\boldsymbol{X_1}$ through $\boldsymbol{X_k}$ represent the independent variables (defined as SDAP levels, FY dummies, race, gender, BMOS, and civilian education), where $\boldsymbol{\beta_0}$ is the intercept, where $\boldsymbol{\beta_1}$ through $\boldsymbol{\beta_k}$ are the estimated value

for the independent variables, and where $\boldsymbol{u}$ is the unobserved error term. The use of this model is to estimate values for the correlation between individual Marine quality and SDAP levels.

It is possible, however, that Marines self-select into their BMOSs, and this self-selection could have partial correlation with their ability and motivation. If this were the case, the OLS estimates would be biased. Fortunately, the panel dataset allows for individual fixed effects estimations. The model is specified as follows

$$\text{Individual Fixed Effects} \quad \boldsymbol{Y_{it} = \beta_o + \beta_1 X_{1,it} + ... \beta_k X_{k,it} + a_i + u_{it}}$$

where $\boldsymbol{Y}$ is the quality, (defined as GCT, Meritorious Promotion, Proficiency, Conduct, PFT, and CFT), $\boldsymbol{i}$ = Individual Marine, and $\boldsymbol{t}$ = Fiscal Year. The term $\boldsymbol{a_i}$ (i=1…n) is the time-invariant fixed effect (representing unobserved ability and motivation). The variables $\boldsymbol{X_{it}}$ represent the independent variables, (defined as SDAP levels, FY dummies, race, gender, BMOS, and civilian education). The parameter $\boldsymbol{\beta_0}$ is the intercept, whereas $\boldsymbol{\beta_1}$ through $\boldsymbol{\beta_k}$ are the estimated values of the partial correlation between quality and the independent variables $\boldsymbol{X_{1,it}}$ thru $\boldsymbol{X_{k,it}}$. Finally, $\boldsymbol{u_{it}}$ is the time-variant error term. The variation in this model comes from Marines changing their BMOSs and their SDAP levels over time.

Finally, the study considers the possibility that there are characteristics of billets that are unobserved to the researcher, yet have a correlation with their SDAP levels and the quality of Marines. For example, it could be that certain billets have more challenging duties, but they are manned by lower quality Marines. At the same time, these billets may be receiving higher SDAP levels due to the challenging nature of the work.

To estimate a billet fixed effect model, we collapse the panel data by billet and year, and the regression estimates are at the billet level. The model is specified below as

$$\text{Billet Fixed Effects} \quad \boldsymbol{Y = \beta_0 + \beta_1 X_{1,it} + ... + \beta_k X_{k,it} + b_i + u_{it}}$$

where $\boldsymbol{Y}$ is the average quality, (defined as GCT, Meritorious Promotion, Proficiency, Conduct, PFT, and CFT), $\boldsymbol{i}$ = BMOS category, and $\boldsymbol{t}$ = Fiscal Year. The variables $\boldsymbol{X_{it}}$ represent the average value of each independent variable for each billet and year,

(including SDAP levels, race, gender, BMOS, and civilian education). The parameter β_0 is the intercept, while $\boldsymbol{\beta_1}$ through $\boldsymbol{\beta_k}$ are the partial correlations between quality and the independent variables $\boldsymbol{X_{1,it}}$ through $\boldsymbol{X_{k,it}}$, and where $\boldsymbol{u_{it}}$ is the error term. The term b_i represents the billet fixed effect (representing the quality or level of challenge for a certain billet that remains constant over time). The variation in this model comes from SDAP levels varying over time and across billets.

This chapter provides a summary of the data, describes the data for the investigation, and provides the methodology for the investigation. Chapter IV shows the estimates for these models.

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IV. RESULTS OF ANALYSIS

A. MODEL

Below are the OLS, Individual Fixed Effects and Billet Fixed Effects models that estimate the correlation between SDAP levels and the effect on Marine and BMOS Quality variables, of *GCT*, *meritorious promotion*, *proficiency*, *conduct*, *PFT*, and *CFT*. The Billet Fixed Effects model has two variations, the model that includes the AFQT variable shown below and the model without the AFQT variable.

1. OLS Model

$$\textit{Quality variable} = \hat{a}_0 + \hat{a}_1(\textit{sdap\_2}) + \hat{a}_2(\textit{sdap\_3}) + \hat{a}_3(\textit{sdap\_4}) + \hat{a}_4(\textit{sdap\_5}) + \hat{a}_5(\textit{sdap\_6}) + \hat{a}_6(\textit{fy\_2006}) + \hat{a}_7\textit{fy\_2007}) + \hat{a}_8(\textit{fy\_2008}) + \hat{a}_9(\textit{fy\_2009}) + \hat{a}_{10}(\textit{fy\_2010}) + \hat{a}_{11}(\textit{fy\_2011}) + \hat{a}_{12}(\textit{fy\_2012}) + \hat{a}_{13}(\textit{careerpl}) + \hat{a}_{14}(\textit{DI}) + \hat{a}_{15}(\textit{CI}) + \hat{a}_{16}(\textit{Recruiter}) + \hat{a}_{17}(\textit{MSG}) + \hat{a}_{18}(\textit{SEA}) + \hat{a}_{19}(\textit{afqt}) + \hat{a}_{20}(\textit{female}) + \hat{a}_{21}(\textit{Native}) + \hat{a}_{22}(\textit{Asian}) + \hat{a}_{23}(\textit{black}) + \hat{a}_{24}(\textit{pacific islander}) + \hat{a}_{25}(\textit{other\_race}) + \hat{a}_{26}(\textit{hispanic}) + \hat{a}_{27}(\textit{civ\_educ\_noh}) + \hat{a}_{28}(\textit{civ\_educ\_sc}) + \hat{a}_{29}(\textit{civ\_educ\_coll}) + \hat{a}_{30}(\textit{civ\_educ\_ms})$$

2. Individual Fixed Effects

$$\textit{Quality variable} = \hat{a}_0 + \hat{a}_1(\textit{fy\_2006}) + \hat{a}_2(\textit{fy\_2007}) + \hat{a}_3(\textit{fy\_2008}) + \hat{a}_4(\textit{fy\_2009}) + \hat{a}_5(\textit{fy\_2010}) + \hat{a}_6(\textit{fy\_2011}) + \hat{a}_7(\textit{fy\_2012}) + \hat{a}_8(\textit{careerpl}) + \hat{a}_9(\textit{DI}) + \hat{a}_{10}(\textit{CI}) + \hat{a}_{11}(\textit{Recruiter}) + \hat{a}_{12}(\textit{MSG}) + \hat{a}_{13}(\textit{SEA}) + \hat{a}_{14}(\textit{female}) + \hat{a}_{15}(\textit{afqt}) + \hat{a}_{16}(\textit{Native}) + \hat{a}_{17}(\textit{Asian}) + \hat{a}_{18}(\textit{black}) + \hat{a}_{19}(\textit{pacific islander}) + \hat{a}_{20}(\textit{other\_race}) + \hat{a}_{21}(\textit{hispanic}) + \hat{a}_{22}(\textit{civ\_educ\_noh}) + \hat{a}_{23}(\textit{civ\_educ\_sc}) + \hat{a}_{24}(\textit{civ\_educ\_coll}) + \hat{a}_{25}(\textit{civ\_educ\_ms}) + \hat{a}_{26}(\textit{sdap\_2}) + \hat{a}_{27}(\textit{sdap\_3}) + \hat{a}_{28}(\textit{sdaap\_4}) + \hat{a}_{29}(\textit{sdap\_5}) + \hat{a}_{30}(\textit{sdap\_6})$$

3. Billet Fixed Effects

$$\textit{Quality variable} = \hat{a}_0 + \hat{a}_1(\textit{fy\_2006}) + \hat{a}_2(\textit{fy\_2007}) + \hat{a}_3(\textit{fy\_2008}) + \hat{a}_4(\textit{fy\_2009}) + \hat{a}_5(\textit{fy\_2010}) + \hat{a}_6(\textit{fy\_2011}) + \hat{a}_7(\textit{fy\_2012}) + \hat{a}_8(\textit{careerpl}) + \hat{a}_9(\textit{DI}) + \hat{a}_{10}(\textit{CI}) + \hat{a}_{11}(\textit{Recruiter}) + \hat{a}_{12}(\textit{MSG}) + \hat{a}_{13}(\textit{SEA}) + \hat{a}_{14}(\textit{female}) + \hat{a}_{15}(\textit{afqt}) + \hat{a}_{16}(\textit{Native}) + \hat{a}_{17}(\textit{Asian}) + \hat{a}_{18}(\textit{black}) + \hat{a}_{19}(\textit{pacific islander}) + \hat{a}_{20}(\textit{other\_race}) + \hat{a}_{21}(\textit{hispanic}) +$$

$\hat{a}_{22}$*(civ_educ_noh)* + $\hat{a}_{23}$*(civ_educ_sc)* $\hat{a}_{24}$*(civ_educ_coll)* + $\hat{a}_{25}$*(civ_educ_ms)* + $\hat{a}_{26}$*(sdap_2)* + $\hat{a}_{27}$*(sdap_3)* + $\hat{a}_{28}$*(sdaap_4)* + $\hat{a}_{29}$*(sdap_5)* + $\hat{a}_{30}$*(sdap_6)*

Although all three models include the variables *fiscal year dummy*, *civilian education, BMOS program, race*, and *female* in the analysis, the interpretation that follows focuses on the effects of SDAP levels on the quality variable (*GCT*, *meritorious promotion*, *proficiency*, *conduct*, *PFT* and *CFT*). The results of the regressions determine if correlations exists between quality and SDAP Levels. If a correlation does exist, how much does the SDAP level actually contribute to the correlation?

B. OLS MODEL RESULTS

Tables 4 and 5 show the OLS model results. The control variables that are omitted for the OLS regressions are SDAP Level 1, Fiscal Year 2005, White, Male, and civilian education High School. The GCT model indicates two of the SDAP Level variables have significant correlation with the GCT variable. The SDAP Level 6 variable is statistically significant at the 1 percent level. The variable SDAP Level 2 is significant at the 5 percent level. The variables SDAP Levels 6 and 2 have negative correlation with GCT, which implies that Marines who receive SDAP Levels 2 and 6 have a lower GCT score, by 0.315 (or 2 percent of the standard deviation) and 0.995 (or 3.5 percent of the standard deviation) respectively, than Marines who receive SDAP Level 1. The variables with no significant correlation are SDAP Levels 3, 4, and 5. The small significant correlation found in the SDAP Levels 2 and 6 variables may be due to other criteria not observed in the OLS model, like individual preference or billet eligibility criteria. It must be noted that these coefficients may be biased because OLS omits important unobservable variables, like ability and motivation, that may be correlated with both quality measures and billet (hence, SDAP levels).

The model for Meritorious Promotion shows three of the five SDAP level variables are statistically significant. The SDAP Levels 3 and 6 variables are statistically significant at the 1 percent level. The SDAP Level 5 variable is significant at the 5 percent level. The variables SDAP Levels 3, 5 and 6 have a positive correlation with Meritorious Promotion, which suggests that Marines who receive SDAP Levels 3, 5, and

6 have a 0.0346 (4.5 percent), 0.0183 (2 percent), and 0.0421 (3.7 percent) slightly higher respectively probability of meritorious promotion over Marines who receive SDAP Level 1. The SDAP level variables with no statistical significance are SDAP Levels 2 and 4 possibly due to fewer observations in these variables. The significant, yet small correlation in the SDAP Levels 3, 5, and 6 variables may be due to other unobserved variables in the OLS model.

Next, model (1) provides estimates using *Conduct* markings as the dependent variable. All five SDAP levels are statistically significant at the 1 percent level, indicating that Marines who receive SDAP Level 2 have 0.0866 (32.4 percent) higher Conduct markings than those who receive SDAP level 1. Marines who receive SDAP Level 3 have 0.0744 (23 percent) higher Conduct markings than those who receive SDAP Level 1. Marines who receive SDAP Level 4 have 0.0899 (15 percent) higher Conduct markings than those who receive SDAP Level 1. Marines who receive SDAP Level 5 have 0.0838 (22 percent) higher Conduct markings than those who receive SDAP Level 1. Marines who receive SDAP Level 6 have 0.0973 (22.4 percent) higher Conduct markings than those who receive SDAP Level 1. This consistent positive correlation may be mutual or a result of an unobserved variable. The significant correlation found between SDAP Levels 2, 3, 4, 5, and 6 indicates that SDAP positively impacts a Marine's Conduct marking. However, the correlation may go the opposite way to Marines with higher Conduct markings are selected to participate in SDA billets with higher SDAP and in larger numbers. The regressions models cannot distinguish between these two possibilities.

OLS Models	**(1)**	**(2)**	**(3)**
VARIABLES	**GCT**	**Meritorious Promotion**	**Conduct**
SDAP Level 2	**-0.315****	0.00456	**0.0866*****
	(0.153)	(0.00638)	(0.00267)
SDAP Level 3	-0.0240	**0.0346*****	**0.0744*****
	(0.188)	(0.00775)	(0.00325)
SDAP Level 4	-0.0346	0.0186	**0.0899*****
	(0.352)	(0.0142)	(0.00597)
SDAP Level 5	0.129	**0.0183****	**0.0838*****
	(0.219)	(0.00905)	(0.00380)

OLS Models	(1)	(2)	(3)
VARIABLES	GCT	Meritorious Promotion	Conduct
SDAP Level 6	**-0.995*** **	**0.0421*** **	**0.0973*** **
	(0.284)	(0.0113)	(0.00478)
Fiscal Year 2006	-0.218*	-0.000738	-0.00779***
	(0.115)	(0.00461)	(0.00194)
Fiscal Year 2007	-0.554***	-0.00437	-0.0224***
	(0.113)	(0.00454)	(0.00190)
Fiscal Year 2008	-0.686***	-0.00940**	-0.0332***
	(0.112)	(0.00452)	(0.00190)
Fiscal Year 2009	-0.715***	-0.00625	-0.0476***
	(0.111)	(0.00452)	(0.00190)
Fiscal Year 2010	-0.708***	0.00410	-0.0568***
	(0.111)	(0.00451)	(0.00189)
Fiscal Year 2011	-0.533***	0.00919**	-0.0658***
	(0.111)	(0.00451)	(0.00189)
Fiscal Year 2012	-0.440***	0.0188***	-0.0750***
	(0.110)	(0.00451)	(0.00189)
Career Planner	0.158	-0.00522	-0.0592***
	(0.293)	(0.0116)	(0.00545)
Drill Instructor	-1.441***	0.0683***	-0.0975***
	(0.255)	(0.0102)	(0.00536)
Combat Instructor	-1.208***	0.0412***	-0.137***
	(0.263)	(0.0104)	(0.00480)
Marine Security Guard	-1.006***	0.0294***	-0.152***
	(0.261)	(0.0103)	(0.00505)
Senior Enlisted Advisor	2.516***	-0.0549***	
	(0.360)	(0.0142)	
All Other MOSs	0.0780	-0.000233	-0.111***
	(0.222)	(0.00877)	(0.00491)
AFQT	0.515***	4.01e-05	0.000546***
	(0.00157)	(6.50e-05)	(2.73e-05)
Female	-4.926***	0.0149***	0.0359***
	(0.120)	(0.00502)	(0.00211)
Native	-0.572**	-0.00604	-0.00536
	(0.260)	(0.0108)	(0.00455)
Asian	-2.448***	0.00471	0.0207***
	(0.174)	(0.00715)	(0.00300)
Black	-4.055***	-0.0171***	0.0199***
	(0.0744)	(0.00306)	(0.00128)
Pacific Islander	-1.784***	0.0109	0.0174***
	(0.276)	(0.0116)	(0.00486)
Other Race	-1.658***	-0.0152**	0.000319
	(0.164)	(0.00687)	(0.00288)
Hispanic	-2.446***	-0.0166***	0.0146***
	(0.0685)	(0.00284)	(0.00119)
Less than High School	1.041***	0.0185	-0.0171***
	(0.293)	(0.0126)	(0.00525)

OLS Models	(1)	(2)	(3)
VARIABLES	GCT	Meritorious Promotion	Conduct
Some College	0.752***	0.00434	0.0421***
	(0.109)	(0.00447)	(0.00188)
College Degree	0.0799	0.00323	0.0566***
	(0.172)	(0.00709)	(0.00301)
Graduate Degree	1.045*	0.0465**	0.0624***
	(0.548)	(0.0230)	(0.00970)
Recruiter			-0.121***
			(0.00603)
Constant	79.59***	0.0351***	4.575***
	(0.310)	(0.0124)	(0.00557)
Observations	60,133	64,538	64,267
R-squared	**0.703**	0.010	0.147

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 4. OLS Model Estimates 1, 2 and 3

Table 5 presents three more OLS model results. The *Proficiency* markings variable had similar results to Conduct Markings. All five SDAP level variables are statistically significant at the 1 percent level, which implies that Marines who receive SDAP Level 2 have 0.0848 (34.5 percent) higher Proficiency markings than those who receive SDAP Level 1. Marines who receive SDAP Level 3 have 0.0760 (25 percent) higher Conduct markings than those who receive SDAP Level 1. Marines who receive SDAP Level 4 have 0.0890 (16.2 percent) higher Conduct markings than those who receive SDAP Level 1. Marines who receive SDAP Level 5 have 0.0805 (23 percent) higher Conduct markings than those who receive SDAP Level 1. Marines who receive SDAP Level 6 have 0.0938 (21.4 percent) higher Conduct markings than those who receive SDAP Level 1. This correlation may also be due to an unobserved variable. Again, this significant correlation across all SDAP levels indicates that SDAP positively impacts a Marine's Proficiency marking. This model cannot account for a reverse correlation, so it could be that the higher a Marine's Proficiency markings, the higher the likelihood that a Marine will participate in an SDA billet with a higher SDAP level.

The OLS model with *PFT* as the dependent variable shows that several of the SDAP level variables are statistically significant. More specifically, SDAP Levels 3, 5,

and 6 variables show significant correlation with PFT scores at the 1 percent level of significance. The SDAP Levels 3 and 5 variables both have a positive correlation with PFT. Therefore, Marines who receive SDAP Level 3 have an 8.9 points higher PFT score than Marines who receive SDAP Level 1. Marines who receive SDAP Level 5 have a 17.9 points higher PFT score than Marines who receive SDAP Level 1. The SDAP Level 6 variable has a negative correlation. Surprisingly, Marines who receive SDAP Level 6 have a 12.5 point lower PFT than those who receive SDAP Level 1. While this correlation is counter intuitive, the SDAP Level 6 variable accounts for the largest number of SDA billets, and more specifically, Recruiters. Marines are often screened and directed to Recruiting Duty and do not volunteer, which may explain some of the negative correlation.

The OLS *CFT* model has significantly correlated with three SDAP level variables. The SDAP Levels 3, 5, and 6 variables show a positive correlation with CFT (at the 1 percent level), which means that Marines who receive SDAP Level 3 have a 4.5 points higher CFT than those who receive SDAP Level 1. Marines who receive SDAP Level 5 have a 7.5 points higher CFT than Marines who receive SDAP Level 1. Marines who receive SDAP Level 6 have a 4 points lower CFT than Marine who receive SDAP Level 1. The SDAP variables with no statistical significance are SDAP Levels 2 and 4, which imply that Marines who receive SDAP levels 2 and 4 have a CFT score that is unaffected by the incentive pay. This could also mean that a simple OLS model cannot observe the true effects of SDAP levels on CFT scores.

OLS Models	**(4)**	**(5)**	**(6)**
VARIABLES	**Proficiency**	**PFT**	**CFT**
SDAP Level 2	**0.0848*** **	1.083	0.281
	(0.00246)	(0.902)	(0.424)
SDAP Level 3	**0.0760*** **	**8.918*** **	**4.500*** **
	(0.00298)	(2.019)	(0.939)
SDAP Level 4	**0.0890*** **	-1.435	1.300
	(0.00548)	(2.735)	(1.277)
SDAP Level 5	**0.0805*** **	**17.94*** **	**7.549*** **
	(0.00349)	(1.947)	(0.908)
SDAP Level 6	**0.0938*** **	**-12.45*** **	**-4.066*** **
	(0.00439)	(2.318)	(1.067)

OLS Models VARIABLES	(4) Proficiency	(5) PFT	(6) CFT
Fiscal Year 2006	-0.00843***		
	(0.00178)		
Fiscal Year 2007	-0.0222***		
	(0.00175)		
Fiscal Year 2008	-0.0336***		
	(0.00174)		
Fiscal Year 2009	-0.0481***		-0.413
	(0.00174)		(0.461)
Fiscal Year 2010	-0.0578***		
	(0.00174)		
Fiscal Year 2011	-0.0674***	2.116***	4.846***
	(0.00174)	(0.437)	(0.209)
Fiscal Year 2012	-0.0770***	5.475***	8.287***
	(0.00174)	(0.436)	(0.208)
Career Planner	-0.0641***	-16.91***	-3.959***
	(0.00500)	(2.470)	(1.117)
Drill Instructor	-0.0939***	-3.631*	-0.797
	(0.00492)	(1.998)	(0.785)
Combat Instructor	-0.142***	-4.855***	1.163
	(0.00440)	(1.820)	(0.853)
Marine Security Guard	-0.158***	3.097	2.075**
	(0.00464)	(2.359)	(1.052)
Senior Enlisted Advisor			3.291***
			(1.080)
All Other MOSs	-0.111***	-0.529	0.701
	(0.00450)	(1.844)	(0.688)
AFQT	0.000600***	-0.0195*	-0.00413
	(2.50e-05)	(0.0107)	(0.00499)
Female	0.0335***	3.098***	0.335
	(0.00193)	(0.871)	(0.410)
Native	0.000164	1.633	-0.0398
	(0.00417)	(1.805)	(0.837)
Asian	0.0164***	7.094***	-0.241
	(0.00275)	(1.164)	(0.542)
Black	0.0170***	6.875***	0.244
	(0.00118)	(0.541)	(0.251)
Pacific Islander	0.0165***	6.915***	1.225
	(0.00446)	(1.710)	(0.789)
Other Race	-0.00152	6.534***	0.391
	(0.00265)	(1.072)	(0.498)
Hispanic	0.0139***	7.083***	0.691***
	(0.00109)	(0.477)	(0.223)
Less than High School	-0.0143***	1.742	-0.943
	(0.00482)	(1.726)	(0.816)
Some College	0.0372***	1.894**	0.692**
	(0.00173)	(0.747)	(0.346)
College Degree	0.0520***	2.003*	1.752***

OLS Models VARIABLES	(4) Proficiency	(5) PFT	(6) CFT
	(0.00276)	(1.079)	(0.500)
Graduate Degree	0.0720***	3.879	3.050*
	(0.00891)	(3.496)	(1.660)
Recruiter	-0.119***	-5.766**	
	(0.00554)	(2.341)	
Constant	4.582***	254.8***	279.7***
	(0.00511)	(2.459)	(1.133)
Observations	64,267	25,535	26,414
R-squared	0.173	0.210	0.171

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 5. OLS Model Estimates 4, 5 and 6

C. FIXED EFFECTS MODEL RESULTS FOR INDIVIDUAL QUALITY

Tables 6 and 7 display the results of the Individual Fixed Effects (FE) model. The reference person for the fixed effects regressions is a Marine receiving SDAP Level 1, in Fiscal Year 2005, White, Male, and with a High School diploma. The individual FE model for *GCT* has three variables with statistical significance. The SDAP Levels 3 and 5 variables are statistically significant at the 1 percent level. The variable SDAP Level 2 is significant at the 5 percent level. The variables SDAP Levels 2, 3, and 5 have positive correlations with GCT, which implies that Marines who receive SDAP Levels 2, 3, and 5 have a higher GCT score than Marines who receive SDAP Level 1. These findings are very different from the OLS results, both in terms of which SDAP variables have a significant correlation, and the sign of the correlation (OLS identified negative, but possibly biased partial correlations). The SDAP variables with no statistical significance are SDAP Levels 4 and 6. The FE model is holding constant unobserved individual characteristics of Marines (such as unobserved ability), which may have biased the OLS estimates.

The FE model for *Meritorious Promotion* shows that only one of the five SDAP level variables is statistically significant. The SDAP Level 3 variable is statistically significant at the 1 percent level. The SDAP Level 3 variable has positive correlation with Meritorious Promotion, which suggests that Marines who receive SDAP Level 3

have a slightly higher probability of a meritoriously promotion than Marines who receive SDAP Level 1. The SDAP variables found to have no statistical significance are SDAP Levels 2, 4, 5, and 6, which is also different from the results from the OLS model. The FE model has fewer variables with correlation and the correlation is always positive when significant. The OLS estimates, however, displayed inconsistencies with signs switching from positive to negative. The difference in the two models suggests that individual fixed effects are important and cause substantial bias in OLS models that omit these effects.

The FE model for *Conduct* markings shows significance in three variables. The SDAP Levels 5 and 6 variables are statistically significant at the 5 percent level, which suggests that Marines who receive SDAP Level 5 have 0.00390 (2.4 percent) higher Conduct markings than those who receive SDAP Level 1. Marines who receive SDAP Level 6 have 0.00392 (2 percent) higher Conduct markings than those who receive SDAP Level 1. The SDAP Level 3 variable is statistically significant at a 0.10 level of significance, which suggests that Marines who receive SDAP Level 3 have 0.02266 (2 percent) higher Conduct markings than those who receive SDAP Level 1. The SDAP level variables with no statistical significance are SDAP Levels 2 and 4. The results of the FE model are notably different from the results of the OLS model. Fewer variables are correlated, with lower significance in the FE model.

Individual FE Model	**(1)**	**(2)**	**(3)**
VARIABLES	**GCT**	**Meritorious Promotion**	**Conduct**
SDAP Level 2	**0.101****	0.00210	0.00101
	(0.0439)	(0.00924)	(0.00107)
SDAP Level 3	**0.163*****	**0.0521*****	**0.00266***
	(0.0562)	(0.0120)	(0.00139)
SDAP Level 4	0.0952	0.0323	0.00213
	(0.0999)	(0.0212)	(0.00245)
SDAP Level 5	**0.178*****	0.00482	**0.00390****
	(0.0662)	(0.0142)	(0.00164)
SDAP Level 6	-0.125	0.0115	**0.00392****
	(0.0832)	(0.0169)	(0.00198)
Fiscal Year 2006	0.0282	0.00804**	0.000361
	(0.0176)	(0.00367)	(0.000425)
Fiscal Year 2007	0.0442**	0.0130***	0.000223
	(0.0196)	(0.00410)	(0.000475)

Individual FE Model	(1)	(2)	(3)
VARIABLES	GCT	Meritorious Promotion	Conduct
Fiscal Year 2008	0.0591***	0.0138***	0.000180
	(0.0216)	(0.00450)	(0.000522)
Fiscal Year 2009	0.0889***	0.0192***	0.000982*
	(0.0230)	(0.00480)	(0.000556)
Fiscal Year 2010	0.0745***	0.0285***	0.00107*
	(0.0238)	(0.00498)	(0.000577)
Fiscal Year 2011	0.119***	0.0326***	0.00108*
	(0.0249)	(0.00520)	(0.000603)
Fiscal Year 2012	0.139***	0.0339***	0.00172***
	(0.0261)	(0.00547)	(0.000634)
Career Planner	0.173**	0.0637***	-0.00713***
	(0.0786)	(0.0168)	(0.00194)
Drill Instructor	0.205**	0.0489***	-0.00627***
	(0.0822)	(0.0177)	(0.00205)
Recruiter	0.0835	0.0576***	-0.00649***
	(0.0764)	(0.0163)	(0.00188)
Marine Security Guard	0.127	0.0755***	0.00302
	(0.0803)	(0.0174)	(0.00201)
Senior Enlisted Advisor	0.473***	-0.0878***	-0.00465
	(0.151)	(0.0299)	(0.00346)
All Other MOSs	0.112*	0.0857***	-0.00750***
	(0.0663)	(0.0142)	(0.00165)
AFQT	0.549***	0.00166***	0.000119**
	(0.00196)	(0.000432)	(5.00e-05)
Less than High School	0.0565	0.0230	-0.0134
	(0.328)	(0.0733)	(0.00847)
Some College	0.121**	-0.0420***	-0.00107
	(0.0541)	(0.0115)	(0.00133)
College Degree	0.259***	0.00529	0.000825
	(0.0677)	(0.0144)	(0.00166)
Graduate Degree	-0.210	-0.0687*	-0.000227
	(0.196)	(0.0409)	(0.00473)
Combat Instructor			
Constant	74.53***	-0.104***	4.540***
	(0.137)	(0.0298)	(0.00344)
Observations	60,133	64,538	64,267
R-squared	**0.691**	0.006	0.003
Number of id	23,908	25,326	25,220

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 6. Fixed Effects Model Estimates 1, 2 and 3

Table 7 displays the results for the first three Individual FE estimates. The *Proficiency* markings variable has significance in three of the SDAP level variables. The SDAP Level 5 variable is statistically significant at the 1 percent level, which implies that Marines who receive SDAP Level 5 have 0.00560 (3.8 percent) higher Proficiency markings than those who receive SDAP Level 1. The SDAP Levels 3 and 6 variables are statistically significant at the 5 percent level, which suggests that Marines who receive SDAP Level 3 have 0.00298 (2.4 percent) higher Proficiency markings than those who receive SDAP Level 1. Marines who receive SDAP Level 6 have 0.00382 (2.1 percent) higher Conduct markings than those who receive SDAP Level 1. SDAP Levels 2 and 4 have no significant correlation. The results from the Individual FE model compared to the OLS model are again notably different. The FE model produced fewer correlated variables and with a much smaller magnitude.

The Individual FE model with *PFT* as the dependent variable shows no statistically significant correlation with the SDAP level variables. These results are significantly different from the OLS model. The OLS model showed three of the SDAP level variables as being statistically significant. Surprisingly, the FE model does not find any correlation between Marines who receive SDAP level and their PFT score. The FE model, controlling for some unobserved individual effects, suggests that SDAP level assignments do not affect the PFT scores of Marines. The FE *CFT* model like the PFT FE model shows no statistically significant correlation with the SDAP level variables. Similar to the PFT FE model, the results are significantly different from the OLS model. The OLS model showed significance with three of the SDAP level variables. As in the PFT FE model, the CFT model suggests that Marine's CFT scores remain unaffected by the SDAP level incentive.

Individual FE Model	**(4)**	**(5)**	**(6)**
VARIABLES	**Proficiency**	**PFT**	**CFT**
SDAP Level 2	0.000862	0.765	0.369
	(0.000964)	(1.038)	(0.623)
SDAP Level 3	**0.00298****	1.992	0.912
	(0.00125)	(4.399)	(2.520)
SDAP Level 4	0.00345	2.782	-0.0917
	(0.00220)	(5.586)	(3.146)

Individual FE Model	**(4)**	**(5)**	**(6)**
VARIABLES	**Proficiency**	**PFT**	**CFT**
SDAP Level 5	**0.00560*** **	1.936	0.795
	(0.00147)	(4.342)	(2.495)
SDAP Level 6	**0.00382** **	7.367	1.721
	(0.00178)	(4.675)	(2.687)
Fiscal Year 2006	0.000949**		
	(0.000383)		
Fiscal Year 2007	0.00107**		
	(0.000427)		
Fiscal Year 2008	0.000940**		
	(0.000470)		
Fiscal Year 2009	0.00147***		
	(0.000501)		
Fiscal Year 2010	0.00199***	-0.746**	0.985**
	(0.000519)	(0.312)	(0.422)
Fiscal Year 2011	0.00182***	-1.083***	4.443***
	(0.000543)	(0.260)	(0.434)
Fiscal Year 2012	0.00285***		6.607***
	(0.000571)		(0.447)
Career Planner	-0.00529***	4.980	-1.566
	(0.00175)	(7.187)	(3.902)
Drill Instructor	-0.00440**	3.071	0.225
	(0.00184)	(6.337)	(3.438)
Recruiter	-0.00467***	0.812	-1.909
	(0.00170)	(6.385)	(3.477)
Marine Security Guard	0.00393**	2.811	1.864
	(0.00181)	(6.445)	(3.525)
Senior Enlisted Advisor	-0.00304		
	(0.00311)		
All Other MOSs	-0.00535***	2.014	-0.291
	(0.00148)	(6.256)	(3.396)
AFQT	7.96e-05*	-0.0125	0.0397
	(4.50e-05)	(0.0823)	(0.0471)
Less than High School	-0.0105	-19.37	-4.973
	(0.00763)	(13.03)	(8.584)
Some College	-0.000871	0.179	-0.865
	(0.00119)	(1.835)	(1.084)
College Degree	7.61e-05	-6.092**	1.682
	(0.00150)	(2.554)	(1.431)
Graduate Degree	-0.000978	-3.711	3.301
	(0.00426)	(5.794)	(3.219)
Combat Instructor		2.710	0.720
		(6.746)	(3.717)
Constant	4.546***	251.4***	278.0***
	(0.00310)	(8.543)	(4.713)
Observations	64,267	25,535	26,414
R-squared	**0.003**	**0.003**	**0.081**

Individual FE Model VARIABLES	(4) Proficiency	(5) PFT	(6) CFT
Number of id	25,220	14,317	14,533

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 7. Fixed Effects Model Estimates 4, 5 and 6

D. BILLET FIXED EFFECT MODEL RESULTS (WITH AFQT)

In this section, the data is aggregated and the regressions are estimated at the billet level. In case there are systematic differences in workload and desirability of certain billets, and if Marines have some choice over their billet, these unobserved billet effects may bias our results. Billet FE regressions net out all unobserved characteristics of a billet that remain constant over time. In these regressions, all variables represent billet-level averages of individual observations. In addition, the regressions are estimated with and without average billet AFQT as a control variable, to see what is the effect of this quality proxy on our results.

The Billet FE estimates, with a variable for ability, are displayed in Tables 8 and 9. The omitted categories for these regressions are SDAP Level 1, Fiscal Year 2005, White, Male, and High School. In this model, the AFQT variable is included to control for Marines' ability. The model for *Meritorious Promotion* shows that none of the SDAP level variables are statistically significant. These results are drastically different from the OLS model and the Individual FE models results. The OLS results found three of the SDAP level variables with significant correlation to Meritorious Promotion, and the Individual FE results found one SDAP level variable with significant correlation. This indicates that there may be important unobserved billet characteristics.

The Billet FE *GCT* model indicates statistical significance with three SDAP level variables. The SDAP Level 3 variable is statistically significant at the 5 percent level. The variable SDAP Levels 2 and 6 are statistically significant at the 10 percent level. The three SDAP level variables all have a negative correlation with GCT, which implies that Marines who receive SDAP Level 3 have a GCT score 5.036 (2.4 percent) points lower than Marines who receive SDAP Level 1. Marines who receive SDAP level 2 have a GCT score 3.635 (1.7 percent) points lower than a Marine who receives SDAP Level 1.

Marines who receive SDAP Level 6 have a GCT score 3.908 (1.9 percent) points lower than Marines who receive SDAP level 1. SDAP Levels 4 and 5 are the SDAP variables found to have no statistical significance. While the Billet FE model results are slightly lower in significance, the magnitudes are much larger than those from the OLS and Individual FE models, which would suggest that the Billet FE model explains effects from unobserved billet effects and those unobserved effect have a negative correlation between SDAP levels and GCT score.

The Billet FE *Proficiency* markings model has statistical significance in all the SDAP level variables. The SDAP Levels 3, 4, and 5 variables are statistically significant at 1 percent level, which suggests that Marines who receives SDAP Level 3 have 0.110 (2.7 percent) higher Proficiency markings than those who receive SDAP Level 1. Marines who receive SDAP Level 4 have 0.188 (3.8 percent) higher Proficiency markings than those who receive SDAP Level 1. Marines who receive SDAP Level 5 have 0.144 (4 percent) higher Proficiency markings than those who receive SDAP Level 1. The SDAP Levels 2 and 6 variables are statistically significant at the 5 percent level of significance, which implies that Marines who receive SDAP Level 2 have 0.0967 (2.5 percent) higher Proficiency markings than those who receive SDAP Level 1. Marines who receive SDAP Level 6 have 0.0859 (2.3 percent) higher Proficiency markings than those who receive SDAP Level 1. This positive correlation is more consistent with the results from the OLS model results and greater in magnitude. This high correlation may be more indicative of the screening guidelines, since all Marines in an SDAP program are required to have minimum Proficiency, which vary by program, but are the same within each program (e.g., Recruiter, Drill Instructor etc...).[27] Also, the correlation may occur in reverse. Marines must have a specific minimum Proficiency marking to participate in SDAP billets.

[27] *MCO P1326.6D Special Duty Assignment Manual,* Appendices A–E.

Billet FE Model with AFQT	**(1)**	**(2)**	**(3)**
VARIABLES	**Meritorious Promotion**	**GCT**	**Proficiency**
Fiscal Year 2006	0.0180	-3.139***	-0.0160
	(0.0437)	(1.165)	(0.0213)
Fiscal Year 2007	0.00971	-0.994	0.0255
	(0.0471)	(1.247)	(0.0229)
Fiscal Year 2008	-0.0144	-2.304*	-0.0191
	(0.0448)	(1.176)	(0.0218)
Fiscal Year 2009	-0.0158	-1.761	-0.0324
	(0.0460)	(1.208)	(0.0224)
Fiscal Year 2010	0.0513	-2.396**	-0.0402*
	(0.0453)	(1.198)	(0.0220)
Fiscal Year 2011	0.0400	-3.016**	-0.0456**
	(0.0456)	(1.207)	(0.0222)
Fiscal Year 2012	-0.00279	-2.118*	-0.0345
	(0.0469)	(1.243)	(0.0228)
(mean) Female	0.0141	-4.829***	-0.00492
	(0.0584)	(1.546)	(0.0284)
(mean) AFQT	-0.000599	0.474***	-0.000483
	(0.00103)	(0.0283)	(0.000500)
(mean) Native	-0.0367	-0.688	-0.106
	(0.143)	(4.969)	(0.0693)
(mean) Asian	-0.128	-2.405	0.0164
	(0.113)	(2.900)	(0.0547)
(mean) Black	-0.0335	-2.739*	-0.0676***
	(0.0498)	(1.409)	(0.0242)
(mean) Pacific Islander	-0.0570	-4.361	-0.0852
	(0.152)	(3.880)	(0.0739)
(mean) Other Race	0.0945	5.597	0.0264
	(0.120)	(3.432)	(0.0583)
(mean) Hispanic	-0.0563	-0.741	-0.0269
	(0.0422)	(1.112)	(0.0205)
(mean) SDAP_2	0.0472	**-3.635***	**0.0967****
	(0.0789)	(2.116)	(0.0384)
(mean) SDAP_3	0.123	**-5.036****	**0.110*****
	(0.0840)	(2.221)	(0.0408)
(mean) SDAP_4	-0.0656	4.379	**0.188*****
	(0.102)	(3.049)	(0.0498)
(mean) SDAP_5	0.0659	-2.782	**0.144*****
	(0.0748)	(2.042)	(0.0364)
(mean) SDAP_6	0.106	**-3.908***	**0.0859****
	(0.0765)	(2.106)	(0.0372)
(mean) SDAP_1			
Constant	0.0449	86.17***	4.532***
	(0.0988)	(2.669)	(0.0481)

Billet FE Model with AFQT	(1)	(2)	(3)
VARIABLES	Meritorious Promotion	GCT	Proficiency
Observations	511	483	511
R-squared	0.058	**0.548**	0.133
Number of BMOS_1	167	163	167

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 8. Billet FE Model Estimates (with AFQT) 1, 2 and 3

The following Billet FE model results, with a variable for ability, are found in Table 9. The Billet FE model for *Conduct* markings has statistical significance in all SDAP level variables. All five SDAP level variables are statistically significant at the 1 percent level, with a positive correlation, which implies that Marines who receive SDAP Level 2 have 0.135 (2.7 percent) higher Conduct markings than those who receive SDAP Level 1. Marines who receive SDAP Level 3 have 0.178 (3.6 percent) higher Conduct markings than those who receive SDAP Level 1. Marines who receive SDAP Level 4 have 0.200 (3.1 percent) higher Conduct markings than those who receive SDAP Level 1. Marines who receive SDAP Level 5 have 0.191 (4 percent) higher Conduct markings than those who receive SDAP Level 1. Marines who receive SDAP Level 6 have 0.140 (2.9 percent) higher Conduct markings than those who receive SDAP Level 1. This positive correlation is more consistent with the results from the OLS model results and greater in magnitude. This high correlation, like the proficiency results, may be more indicative of the screening guidelines. Also, the correlation may occur in reverse. Marines must have specific minimum Conduct markings to participate in SDAP billets.

The Billet FE model with *PFT* as the dependent variable shows no statistically significant correlation with the SDAP level variables. These results are consistent with the Individual FE model for the PFT variable. The Billet FE model suggests, like the Individual FE model, that no correlation exists between Marines who receive a SDAP level and their PFT score. The Billet FE PFT model controls for unobserved billet effects. The Billet FE model suggests that Marines with higher or lower PFT scores are unaffected by SDAP level incentives.

The Billet FE model for *CFT*, much like the Billet FE PFT model, has no statistical significance with the SDAP level variables. Similar to the Billet FE PFT model, the results are consistent with the Individual FE CFT model. The Billet FE CFT model suggests, like the Individual FE CFT model, that no correlation exists between Marines who receive a SDAP level and their CFT score. The Billet FE CFT model controls for unobserved billet effects, which have no control variables in the original OLS model, which may explain why CFT has correlation with the SDAP level variables in the OLS model. As in the Billet FE PFT model, the Billet FE CFT model suggests that Marines' CFT scores remain unaffected by the SDAP level incentive.

Billet FE Model with AFQT VARIABLES	**(4) Conduct**	**(5) PFT**	**(6) CFT**
Fiscal Year 2006	-0.0120		
	(0.0276)		
Fiscal Year 2007	0.0321		
	(0.0297)		
Fiscal Year 2008	-0.0282		
	(0.0283)		
Fiscal Year 2009	-0.0320		-11.97***
	(0.0290)		(2.985)
Fiscal Year 2010	-0.0373	-4.256	-9.616***
	(0.0286)	(3.144)	(2.269)
Fiscal Year 2011	-0.0413		-2.949
	(0.0288)		(2.339)
Fiscal Year 2012	-0.0271	2.159	
	(0.0296)	(3.726)	
(mean) Female	-0.0292	-9.401	1.918
	(0.0369)	(8.913)	(5.810)
(mean) AFQT	-0.000673	0.384**	-0.0494
	(0.000649)	(0.191)	(0.115)
(mean) Native	-0.0654	8.974	-5.575
	(0.0900)	(19.50)	(12.29)
(mean) Asian	0.0769	32.82*	-13.48
	(0.0710)	(17.06)	(9.462)
(mean) Black	-0.0407	40.11***	-3.103
	(0.0314)	(9.303)	(5.642)
(mean) Pacific Islander	-0.0292	30.54	61.85***
	(0.0960)	(23.19)	(14.55)
(mean) Other Race	0.0549	-27.83	-1.760
	(0.0757)	(33.07)	(20.65)
(mean) Hispanic	-0.0298	31.80***	-0.842
	(0.0267)	(7.363)	(4.470)

Billet FE Model with AFQT	**(4)**	**(5)**	**(6)**
VARIABLES	**Conduct**	**PFT**	**CFT**
(mean) SDAP_2	**0.135*** **	164.0	20.89
	(0.0498)	(140.4)	(77.19)
(mean) SDAP_3	**0.178*** **	163.2	17.05
	(0.0530)	(139.2)	(76.76)
(mean) SDAP_4	**0.200*** **		
	(0.0646)		
(mean) SDAP_5	**0.191*** **	167.2	21.52
	(0.0473)	(139.3)	(76.76)
(mean) SDAP_6	**0.140*** **	134.2	24.55
	(0.0483)	(139.0)	(76.67)
(mean) SDAP_1		158.3	15.32
		(140.4)	(77.28)
Constant	4.487***	73.27	272.3***
	(0.0624)	(135.5)	(74.71)
Observations	511	206	230
R-squared	**0.085**	**0.512**	**0.374**
Number of BMOS_1	167	113	114

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 9. Billet FE Model Estimates (with AFQT) 4, 5 and 6

E. BILLET FIXED EFFECTS MODEL (WITHOUT AFQT)

A possible argument is that the previous set of billet FE regressions were controlling for too much when including average AFQT in the estimations. After all, the quality measures are all in part correlated with the ability of Marine. To investigate this hypothesis, this section presents billet FE regressions results that do not control for AFQT. All estimates are in Tables 10 and 11. The omitted categories for the billet FE regressions are SDAP Level 1, Fiscal Year 2005, White, Male, and High School. This model excludes the AFQT variable not controlling for Marines' individual ability. The model for Meritorious Promotion shows that none of the SDAP level variables are statistically significant. These results are consistent with the Billet FE model for Meritorious Promotion and contrary to the OLS and the individual FE model, which could be because Meritorious Promotion has to do more with a billet specific effect rather than the SDAP level assigned. It also indicates that billet effects exist for which neither

the OLS nor the Individual FE models where able to control. This may have resulted in a correlation possibly due to some unobserved variable associated with billets.

The Billet FE *GCT* model indicates no statistical significance with any SDAP level variables. The lack of significant correlation may be due to a high correlation between GCT and AFQT. The OLS, Individual FE, and Billet FE with AFQT models all control for ability with the AFQT variable, this model does not control for ability, which would suggest that the GCT score is highly correlated with AFQT and not with SDAP levels. The Billet FE without AFQT controls suggests zero correlation between GCT score and SDAP levels, which makes sense since, the GCT score, like the AFQT score, is derived from elements of the Armed Services Vocational Aptitude Battery (ASVAB) entry-level exam.

The Billet FE without AFQT *Proficiency* markings model has statistical significance in all the SDAP level variables. The SDAP Levels 3, 4, and 5 variables are statistically significant at the 1 percent level, which suggests that Marines who receive SDAP Level 3 have 0.108 (2.7 percent) higher Proficiency markings than those who receive SDAP Level 1. Marines who receive SDAP Level 4 have 0.187 (3.8 percent) higher Proficiency markings than those who receive SDAP Level 1. Marines who receive SDAP Level 5 have 0.139 (3.9 percent) higher Proficiency markings than those who receive SDAP Level 1. The SDAP Levels 2 and 6 variables are statistically significant at the 5 percent level, which implies that Marines who receive SDAP Level 2 have 0.0925 (2.4 percent) higher Proficiency markings than those who receive SDAP Level 1. Marines who receive SDAP Level 6 have 0.0829 (2.2 percent) higher Proficiency markings than those who receive SDAP Level 1. The results from the Billet FE regression without AFQT are consistent with the results from the OLS and Billet FE without AFQT model with significance in every SDAP level variable. This high correlation may be more indicative of the screening guidelines, since all Marines in an SDAP program are required to have minimum Proficiency markings that vary by program, but are the same within each program.

Billet FE Model without AFQT	**(1)**	**(2)**	**(3)**
VARIABLES	**Meritorious Promotion**	**GCT**	**Proficiency**
Fiscal Year 2006	0.0170	-2.124	-0.0168
	(0.0437)	(1.616)	(0.0213)
Fiscal Year 2007	0.0103	-0.907	0.0259
	(0.0470)	(1.732)	(0.0229)
Fiscal Year 2008	-0.0144	-1.686	-0.0191
	(0.0447)	(1.633)	(0.0218)
Fiscal Year 2009	-0.0152	-1.234	-0.0320
	(0.0459)	(1.678)	(0.0223)
Fiscal Year 2010	0.0524	-2.777*	-0.0393*
	(0.0452)	(1.664)	(0.0220)
Fiscal Year 2011	0.0400	-2.972*	-0.0456**
	(0.0455)	(1.677)	(0.0222)
Fiscal Year 2012	-0.00319	-1.438	-0.0349
	(0.0469)	(1.726)	(0.0228)
(mean) Female	0.0146	-4.582**	-0.00451
	(0.0583)	(2.147)	(0.0284)
(mean) Native	-0.0397	-1.730	-0.108
	(0.142)	(6.903)	(0.0693)
(mean) Asian	-0.127	-1.371	0.0167
	(0.112)	(4.028)	(0.0547)
(mean) Black	-0.0231	-9.851***	-0.0592***
	(0.0464)	(1.866)	(0.0226)
(mean) Pacific Islander	-0.0495	-8.300	-0.0791
	(0.151)	(5.380)	(0.0736)
(mean) Other Race	0.0974	0.364	0.0288
	(0.120)	(4.749)	(0.0582)
(mean) Hispanic	-0.0508	-3.954***	-0.0224
	(0.0411)	(1.521)	(0.0200)
(mean) SDAP_2	0.0420	0.523	**0.0925****
	(0.0783)	(2.919)	(0.0381)
(mean) SDAP_3	0.120	-2.702	**0.108*****
	(0.0836)	(3.080)	(0.0407)
(mean) SDAP_4	-0.0680	0.413	**0.187*****
	(0.102)	(4.223)	(0.0497)
(mean) SDAP_5	0.0604	0.658	**0.139*****
	(0.0742)	(2.823)	(0.0361)
(mean) SDAP_6	0.103	-0.847	**0.0829****
	(0.0761)	(2.915)	(0.0371)
(mean) SDAP_1			
Constant	0.00885	114.5***	4.503***

Billet FE Model without AFQT	(1)	(2)	(3)
VARIABLES	Meritorious Promotion	GCT	Proficiency
	(0.0770)	(2.873)	(0.0375)
Observations	511	483	511
R-squared	0.057	0.125	0.130
Number of BMOS_1	167	163	167

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 10. Billet FE Model Estimates (without AFQT) 1, 2 and 3

Table 8 lists the results of the Billet FE model, without AFQT. The *Conduct* markings variable had similar results to Proficiency markings. All five SDAP level variables are statistically significant at the 1 percent level, which implies that Marines who receive SDAP Level 2 have 0.129 (2.6 percent) higher Conduct markings than those who receive SDAP Level 1. Marines who receive SDAP Level 3 have 0.174 (3.3 percent) higher Conduct markings than those who receive SDAP Level 1. Marines who receive SDAP Level 4 have 0.197 (3 percent) higher Conduct markings than those who receive SDAP Level 1. Marines who receive SDAP Level 5 have 0.185 (3.9 percent) higher Conduct markings than those who receive SDAP Level 1. Marines who receive SDAP Level 6 have 0.135 (2.8 percent) higher Conduct markings than those who receive SDAP Level 1, which suggests that the highly significant correlation across all SDAP levels indicates that SDAP level positively impacts Marines' Proficiency markings. The positive correlation is consistent with the results from the OLS model results and greater in magnitude. This high correlation could be because of the screening guidelines as mentioned in the Billet FE with AFQT model.

The Billet FE without AFQT *PFT* model has no statistical significance with the SDAP level variables. These results are consistent with the Individual FE model and the Billet FE with AFQT models for the PFT variable. The Billet FE without AFQT model suggests, like the two previous FE model, that no correlation exists between Marines who receive a SDAP level and their PFT score. The Billet FE without AFQT PFT model controls for unobserved billet effects, which have no control variables in the original OLS

model. The Billet FE without AFQT model suggests that Marines with higher or lower PFT scores are unaffected by SDAP level assignments.

The Billet FE without AFQT *CFT* model, much like the Billet FE without AFQT PFT model, has no statistical significance with the SDAP level variables. The results are consistent with the Individual FE CFT and the Billet FE w/AFQT models. The Billet FE without AFQT CFT model suggests, like both the Individual FE CFT and the Billet FE with AFQT models, no correlation occurs between Marines who receive a SDAP level and their CFT score. As in the Billet FE without AFQT PFT model, the Billet FE without AFQT CFT model suggests that Marine's CFT scores remain unaffected by the SDAP level assignment.

Billet FE Model without AFQT	**(4)**	**(5)**	**(6)**
VARIABLES	**Conduct**	**PFT**	**CFT**
Fiscal Year 2006	-0.0132		
	(0.0276)		
Fiscal Year 2007	0.0328		
	(0.0297)		
Fiscal Year 2008	-0.0282		
	(0.0283)		
Fiscal Year 2009	-0.0314		-11.83***
	(0.0290)		(2.955)
Fiscal Year 2010	-0.0360	-4.118	-9.518***
	(0.0286)	(3.203)	(2.249)
Fiscal Year 2011	-0.0413		-2.816
	(0.0288)		(2.310)
Fiscal Year 2012	-0.0276	2.959	
	(0.0296)	(3.775)	
(mean) Female	-0.0287	-14.01	2.478
	(0.0369)	(8.778)	(5.640)
(mean) Native	-0.0688	9.141	-5.609
	(0.0900)	(19.88)	(12.24)
(mean) Asian	0.0773	37.04**	-13.46
	(0.0710)	(17.25)	(9.424)
(mean) Black	-0.0291	35.65***	-2.436
	(0.0293)	(9.208)	(5.404)
(mean) Pacific Islander	-0.0208	33.47	61.47***
	(0.0956)	(23.59)	(14.46)
(mean) Other Race	0.0582	-31.89	-1.281
	(0.0756)	(33.64)	(20.53)
(mean) Hispanic	-0.0236	32.48***	-0.757
	(0.0260)	(7.496)	(4.448)

Billet FE Model without AFQT	**(4)**	**(5)**	**(6)**
VARIABLES	**Conduct**	**PFT**	**CFT**
(mean) SDAP_2	**0.129*** **	160.6	21.76
	(0.0495)	(143.0)	(76.85)
(mean) SDAP_3	**0.174*** **	151.1	18.87
	(0.0529)	(141.7)	(76.33)
(mean) SDAP_4	**0.197*** **		
	(0.0646)		
(mean) SDAP_5	**0.185*** **	160.6	22.59
	(0.0469)	(141.9)	(76.41)
(mean) SDAP_6	**0.135*** **	128.2	25.54
	(0.0481)	(141.6)	(76.33)
(mean) SDAP_1		154.1	16.18
		(143.0)	(76.95)
Constant	4.447***	104.4	267.9***
	(0.0487)	(137.2)	(73.71)
Observations	511	206	230
R-squared	0.082	0.487	0.373
Number of BMOS_1	167	113	114

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 11. Billet FE Model Estimates (without AFQT) 4, 5 and 6

This chapter discusses the results of the six OLS models, the six Individual FE models, the results of the six Billet FE model with the AFQT variable, and six Billet FE models without the AFQT variable. A brief summary for each provides suggestions for the results and discusses potential biases and false correlations.

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V. SUMMARY AND RECOMMENDATIONS

A. SUMMARY

This investigation uses OLS and Fixed Effects models to determine if a correlation exists between quality of Marines and SDAP levels. By comparing the results from the OLS model, Individual Fixed Effects, and Billet Fixed Effect models, the analysis can determine if the current process for assigning SDAP levels considers quality when assigning SDAP levels.

All three models contain independent variables selected by the author as a starting point for the investigation of quality. The independent quality variables are ran against, SDAP Level 2 through 6, to predict the effect of SDAP level on Marine quality.

The OLS model identifies two SDAP levels with a negative correlation to *GCT*, three SDAP levels with a positive correlation to *Meritorious Promotion*, all five SDAP levels with a positive correlation to *Conduct* and *Proficiency*, and three SDAP levels both with positive and negative correlation to *PFT* and *CFT*. According to the R-Squared value on Tables 4 and 5 of Chapter IV, the GCT OLS model performed the best, with 70 percent of the variation in GCT explained by the dependant variables. The Marine Corps uses a Marine's GCT score to place Marines correctly into MOSs. Due to the negative correlation between SDAP level and GCT, it is highly likely that an omitted variable bias exists.

The Individual Fixed Effects model identifies only positive correlations. Three SDAP levels with correlation to *GCT*, one SDAP level with correlation to *Meritorious Promotion*, three SDAP levels with correlation to *Conduct* and *Proficiency*, and no SDAP levels with correlation to *PFT* and *CFT*. The Individual Fixed Effects model for *GCT* again, according to the R-Squared value on Table 6 and 7 from Chapter IV, considerably outperforms the rest of the Individual FE models, and explains 69 percent of the variation in *GCT* with the dependant variables.

The Billet Fixed Effects model, with AFQT as a control for individual ability, collapses the data into BMOS groups, which results in fewer observations and provides

controls for billet specific correlations. It identifies no SDAP levels with correlation to *Meritorious Promotion*, three SDAP levels with negative correlation to *GCT*, all five SDAP levels with positive correlation to *Conduct* and *Proficiency*, and no SDAP levels with correlation to *PFT* or *CFT*. The Billet Fixed Effects *GCT* model again performs well, and from the R-Square value on Tables 8 and 9 of Chapter IV, explains 55 percent of the variation in *GCT* with the dependant variables. While not statistically significant, the dependant variables in the *PFT* model explains 51 percent of the variation in PFT and the dependant variables in the *CFT* model explains 37 percent of the variation in CFT.

The Billet Fixed Effects model, without AFQT, collapses the data into BMOS groups, which results in fewer observations and provides controls for unobserved billet effects. It identifies no SDAP levels with correlation to *Meritorious Promotion* or to *GCT*, all five SDAP levels have a positive correlation to *Conduct* and *Proficiency*, and no SDAP levels have correlation to *PFT* or *CFT*. While the SDAP levels for PFT and CFT are statistically insignificant, the Billet Fixed Effects PFT model performed the best. According to the R-Squared value on Table 10 and 11 of Chapter IV, it explains 48 percent of the variation in PFT with the dependant variables. The *CFT* model was the next highest, which explains 37 percent of the variation in CFT.

B. PRIMARY RESEARCH QUESTIONS

- Are the assignments of Marine Corps SDAP levels allocated for maximum efficiency?

While the investigation does not provide a definitive answer on the efficiency of the SDAP level assignment process, the review of the process indicates a high level of ambiguity in the criteria that determines the level of SDAP a program will receive. The subjectivity combined with the difficultly in measuring the three SDAP criteria provides an indication that the process is less than efficient.

- Should other criteria be included when assigning SDAP levels?

Due to the ambiguity and subjectivity in the current process, including additional criteria that will provide measurements that future working groups can quantify to provide a recommendation that has comparable statistics across all SDAP programs and billets.

- Do higher SDAP levels imply higher quality Marines in SDA billets?

The investigation reveals that higher SDAP levels do not imply higher quality; on the contrary, in some cases, quality is lower when the SDAP level is higher. Such is the case with Recruiter; the OLS and Individual FE model provide results that show all but two SDAP level variables have a negative correlation or are insignificant. Cases also occur in which no correlation exists in measures of quality, such as PFT and CFT, which are obvious indicators of an individual Marine quality that should in some way be observed in SDAP levels and SDAP programs.

- Does the current method of assigning SDAP levels effectively incentivize the SDA billets or programs that require it the most?

The investigation is unable to determine how effective SDAP levels incentivize Marines to participate in the programs that require greater participation. The investigation does not go that far; however, a recommendation for further research to address this question follows.

- Which SDA billets have a need for higher quality participation and should lower quality be used to determine assignment of SDAP levels?

The results from the OLS model provide the most negative correlation occurrences between the SDAP program and quality. Career Planner has four negative correlations, Combat Instructor and Recruiter have three correlations. The largest negative correlation in magnitude is in the Career Planner program with the PFT quality variable, which indicates that the Career Planner program needs incentives to attract Marines with higher PFTs, but the opposite is true. The Career Planner program has recently downgraded from SDAP level 2 to SDAP level 1. The significant negative correlation with PFT is not a decrease in quality because of this recent change, but instead, is an observation of how little consideration is given to quality in the SDAP programs when assigning SDAP level. Further research will need to be done to determine how including quality as an assignment criteria will affect the assignment of SDAP levels.

C. RECOMMENDATIONS

1. Do Not Include GCT When Assigning SDAP Levels

The OLS, Individual FE and Billet FE models found negative, positive, and then negative correlation between the GCT variable and the SDAP levels, which makes it difficult to determine if GCT serves as a good measure of Marine quality. However, the correlation between GCT and SDAP levels ceases to exist when the Billet FE model is ran without controlling for ability (AFQT), which is most likely because the GCT score is derived from elements of the ASVAB test, just like the AFQT score, which means a high correlation exists between the two. Therefore, including GCT as criteria for measuring Marine quality, when assigning SDAP levels, does not correctly interpret quality but rather individual ability.

2. Do Not Include Meritorious Promotion When Assigning SDAP Levels

While the models measures the effect of SDAP levels on Meritorious Promotion within the SDAP program as a whole, it reveals that Meritorious Promotions are netted out with the Billet FE models, which indicates that Meritorious Promotions are more highly associated with the programs rather than individual quality. This criterion can be useful when determining which program is obtaining more Meritoriously Promoted Marines. However, since Meritorious Promotions are allocated by program, and SDAP level are generally assigned to programs, this measure will only be beneficial for non-SDA Meritorious Promotions to measure the quality of new participants.

3. Include Conduct When Assigning SDAP Levels

All the SDAP level variables, except on two occasions, have correlation and are statistically significant in the OLS and Individual FE models between SDAP levels and Conduct. Conduct markings are statistically significant with all SDAP level variables when the Billet FE models are ran, with or without the AFQT variable. Much of the significant correlation is due to a high correlation between Conduct markings and program assignments. Most BMOSs belong to a specific program (e.g., Recruiting, Drill instructor etc.) and each program has minimum Conduct markings requirements, which

actually decreases the correlation between SDAP levels and Conduct. The Individual FE model still finds varying significance and positive correlation with three of the five SDAP levels. Therefore, including Conduct as a measure of Individual Marine quality correctly interprets the Marine quality in a program or SDAP level. This measure will help determine the SDAP level assignment to a program, along with other weighted measurements.

4. Include Proficiency When Assigning SDAP Levels

Again, all of the SDAP level variables, except on two occasions, have correlation and are statistically significant in the OLS and Individual FE models between SDAP levels and Proficiency. Like Conduct, Proficiency markings are statistically significant with all SDAP level variables significant when the Billet FE models are ran, with or without AFQT. As in Conduct, much of the significant correlation is due to a high correlation between Conduct markings and program assignments. The Individual FE model found varying significance and correlation with some but not all the SDAP levels. Including Proficiency as a measure of Individual Marine quality will correctly interpret the Marine quality in a program or SDAP level. This measure will help determine the SDAP level assignment to a program, along with other weighted measurements.

5. Include PFT When Assigning SDAP Levels

While the OLS Model found some positive and negative correlation between SDAP levels and PFT score, the other three models did not find any correlation, which means that PFT scores are not part of the consideration when assigning SDAP levels. Physical fitness is one of the easiest measures of individual quality and while most SDAP program requires a minimum PFT score for initial screening, passing the PFT is the only requirement thereafter. Including PFT as measure of quality for SDAP level assignment will identify a measurable aspect of quality in a program. This measure will help determine the SDAP level assignment for a program, along with other weighted measurements.

6. Include CFT When Assigning SDAP Levels

Similar results were found with CFT as in PFT. The OLS Model finds some positive and negative correlation between SDAP levels and CFT score and the other models do not find any correlation, which means CFT scores are also not part of the consideration when assigning SDAP levels. The CFT is another easy measure of individual quality. Including CFT as measure of quality for SDAP level assignment will identify a tangible and measurable aspect of quality in a program. This measure will help determine the SDAP level assignment for a program, along with other weighted measurements.

7. Include Attrition rates When Assigning SDAP Levels

Another important topic from Chapter I not analyzed in this investigation is measuring attrition rates, both at SDA schools, such as the Recruiting school, Drill Instructor school, Combat Instructor school, and Marine Security Guard school, and for those who fail to complete a 36-month tour. The attrition data can be obtained from Manpower Management Enlisted Affairs, Special Duty Assignments Section or Training and Education Command and Marine Corps Recruiting Command. The attrition rates can attest to the level of difficulty in the program, as directed in the DoD Instruction (DoDI) and Marine Corps Order (MCO), which will not be an absolute determinant but a weighted measurement along with others in assigning SDAP levels to SDA programs.

8. Include ASR Rates When Assigning SDAP Levels

Identifying participation rates can help determine which SDA program is struggling with getting Marines to volunteer in their program. The Authorized Strength Report (ASR) provides the projected authorized strength levels by BMOS for each unit. Determining a program's manning percentage can help to establish a measure for a need to incentivize. The SDAP program is an incentive pay program created to encourage qualified Marines to undertake the demanding duties of SDAP billets. This rate will be included with the group of weighted measurements to help determine SDAP level assignments.

All the aforementioned measurements discussed will contribute to a more accurate assignment of SDAP levels, which will lead to incentivizing Marines effectively to participate in the programs that require greater participation.

9. Conduct a Survey on SDAP as An Incentive

Separate from establishing weighted measures for assigning SDAP levels; conduct a survey in a future study that examines Marines' opinion on SDAP. A common misconception exists that SDAP is assigned to billets that cause Marines to have high out-of-pocket expenses, which categorizes SDAP as an allowance, such as Basic Allowance for Housing (BAH) or Cost of Living Allowance (COLA). This viewpoint is completely wrong; SDAP is an incentive allowance to encourage Marines to participate in SDA programs. The survey should be given to a random sample of enlisted Marines who may or may not have served on a SDA. In addition, ask specific questions, such as, what is SDAP? What is it for? Does SDAP encourage you to serve in an SDA program? Have you ever served in an SDA billet? What made you decide to volunteer for an SDA program? The survey will provide information on how Marines view SDAP. Further, it will provide data on how many Marines share in the previously mentioned misconception, if SDAP is an incentive to Marines to participate in SDAP programs, and if the current SDAP rates are sufficient incentive.

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APPENDIX A.

SPECIAL DUTY ASSIGNMENT
ASSESSMENT WORKSHEET

Date: _____

_____
Name of Assignment

The SDAP program enhances the Marine Corps' ability to size and shape and stabilize the force by using a monetary incentive to encourage Marines with specific designated skills to apply their knowledge and experience to uniquely challenging assignments.

The more challenging assignments receive a higher level of SDA pay.

Purpose: To obtain your assessment as to how challenging the SDA is by using a scale from 1 to 10.

I. How challenging is the special duty assignment?

1 2 3 4 5 6 7 8 9 10
challenging moderately challenging extremely challenging

_____

II. Pay rate level?
Initial assessment of pay level, circle one

1 = $75
2 = $150
3 = $ 225
4 = $300
5 = $375
6 = $450

_____
Organizational Advocate

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APPENDIX B. MODEL RESULTS

This is the STATA results for each regression; no rounding of numbers has been applied.

****SDAP FY05–12 OLS model****

STATA COMMANDS

iis id

tis fy

reg gct sdap_2 sdap_3 sdap_4 sdap_5 sdap_6 ffy_2006- ffy_2012 careerpl- MOSother afqt female Native Asian black pacisl race_na hispanic civ_educ_nohs civ_educ_sc civ_educ_coll civ_educ_ms

```
note: recruiter omitted because of collinearity
```

Source	SS	df	MS		
Model	5522323.29	30	184077.443	Number of obs	= 60133
				F(30, 60102)	= 4751.62
Residual	2328349.64	60102	38.7399694	Prob > F	= 0.0000
				R-squared	= 0.7034
				Adj R-squared	= 0.7033
Total	7850672.93	60132	130.557323	Root MSE	= 6.2241

gct	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
sdap_2	-.315068	.1534604	-2.05	0.040	-.615851	-.0142851
sdap_3	-.0240093	.1879527	-0.13	0.898	-.3923971	.3443786
sdap_4	-.0346341	.3521751	-0.10	0.922	-.7248986	.6556304
sdap_5	.1292714	.2194113	0.59	0.556	-.3007756	.5593183
sdap_6	-.9947192	.2840018	-3.50	0.000	-1.551364	-.4380748
ffy_2006	-.2182336	.1149751	-1.90	0.058	-.4435853	.007118
ffy_2007	-.5543299	.1126147	-4.92	0.000	-.7750551	-.3336047
ffy_2008	-.6855538	.1117398	-6.14	0.000	-.9045642	-.4665434
ffy_2009	-.715342	.1113499	-6.42	0.000	-.9335882	-.4970958
ffy_2010	-.7083905	.1108538	-6.39	0.000	-.9256642	-.4911167
ffy_2011	-.5332507	.1106136	-4.82	0.000	-.7500538	-.3164476
ffy_2012	-.4397452	.1103792	-3.98	0.000	-.6560889	-.2234015
careerpl	.158482	.2927999	0.54	0.588	-.4154069	.7323709
DI	-1.441467	.2554827	-5.64	0.000	-1.942214	-.9407197
CI	-1.20773	.2634178	-4.58	0.000	-1.72403	-.6914302
recruiter	(omitted)					
MSG	-1.006162	.2612082	-3.85	0.000	-1.518131	-.4941933
SEA	2.515945	.3596431	7.00	0.000	1.811043	3.220847
MOSother	.0779899	.2222355	0.35	0.726	-.3575925	.5135723
afqt	.5152608	.0015719	327.80	0.000	.51218	.5183417
female	-4.926113	.1203506	-40.93	0.000	-5.162001	-4.690226
Native	-.5716884	.2603157	-2.20	0.028	-1.081908	-.0614687
Asian	-2.447711	.1737913	-14.08	0.000	-2.788343	-2.10708
black	-4.055057	.0744071	-54.50	0.000	-4.200895	-3.909219
pacisl	-1.783964	.2756278	-6.47	0.000	-2.324195	-1.243732
race_na	-1.657772	.1640995	-10.10	0.000	-1.979407	-1.336136
hispanic	-2.445724	.0684559	-35.73	0.000	-2.579898	-2.31155
civ_educ_n~s	1.040619	.2933171	3.55	0.000	.4657159	1.615521
civ_educ_sc	.7521975	.1091106	6.89	0.000	.5383404	.9660546
civ_educ_c~l	.0798844	.1718743	0.46	0.642	-.2569898	.4167585
civ_educ_ms	1.045498	.5478958	1.91	0.056	-.0283798	2.119375
_cons	79.59362	.3099691	256.78	0.000	78.98608	80.20116

reg merit sdap_2 sdap_3 sdap_4 sdap_5 sdap_6 ffy_2006- ffy_2012 careerpl- MOSother afqt female Native Asian black pacisl race_na hispanic civ_educ_nohs civ_educ_sc civ_educ_coll civ_educ_ms

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note: recruiter omitted because of collinearity
```

Source	SS	df	MS		
Model	47.1636803	30	1.57212268	Number of obs	= 64538
Residual	4577.29534	64507	.070958118	F(30, 64507)	= 22.16
				Prob > F	= 0.0000
Total	4624.45902	64537	.071655934	R-squared	= 0.0102
				Adj R-squared	= 0.0097
				Root MSE	= .26638

merit	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
sdap_2	.0045617	.0063781	0.72	0.474	-.0079393	.0170627
sdap_3	.0346315	.0077466	4.47	0.000	.0194481	.0498149
sdap_4	.01864	.0141654	1.32	0.188	-.0091243	.0464043
sdap_5	.0182682	.0090465	2.02	0.043	.0005369	.0359994
sdap_6	.0421097	.0112919	3.73	0.000	.0199776	.0642418
ffy_2006	-.0007383	.004613	-0.16	0.873	-.0097797	.0083031
ffy_2007	-.0043671	.004536	-0.96	0.336	-.0132577	.0045235
ffy_2008	-.0094018	.0045214	-2.08	0.038	-.0182638	-.0005398
ffy_2009	-.0062527	.0045213	-1.38	0.167	-.0151144	.002609
ffy_2010	.0040999	.0045139	0.91	0.364	-.0047474	.0129471
ffy_2011	.00919	.0045123	2.04	0.042	.0003459	.0180342
ffy_2012	.0187905	.0045112	4.17	0.000	.0099486	.0276324
careerpl	-.0052225	.0115632	-0.45	0.652	-.0278864	.0174414
DI	.0682616	.0102229	6.68	0.000	.0482247	.0882985
CI	.0412005	.0104323	3.95	0.000	.0207531	.0616478
recruiter	(omitted)					
MSG	.0294018	.0102685	2.86	0.004	.0092755	.0495281
SEA	-.0549159	.0142382	-3.86	0.000	-.0828227	-.0270091
MOSother	-.0002325	.0087697	-0.03	0.979	-.0174211	.0169561
afqt	.0000401	.000065	0.62	0.538	-.0000874	.0001675
female	.0148521	.0050224	2.96	0.003	.0050082	.024696
Native	-.0060425	.0108362	-0.56	0.577	-.0272815	.0151965
Asian	.0047117	.0071538	0.66	0.510	-.0093097	.0187332
black	-.0170711	.0030591	-5.58	0.000	-.023067	-.0110752
pacisl	.0108671	.0116031	0.94	0.349	-.0118749	.0336092
race_na	-.0152132	.0068748	-2.21	0.027	-.0286878	-.0017385
hispanic	-.0165844	.0028372	-5.85	0.000	-.0221454	-.0110235
civ_educ_n~s	.0185012	.0125507	1.47	0.140	-.0060983	.0431006
civ_educ_sc	.0043411	.004471	0.97	0.332	-.004422	.0131043
civ_educ_c~l	.0032268	.0070885	0.46	0.649	-.0106665	.0171202
civ_educ_ms	.0464678	.0230048	2.02	0.043	.0013784	.0915572
_cons	.0350982	.0123693	2.84	0.005	.0108545	.0593419

reg conduct sdap_2 sdap_3 sdap_4 sdap_5 sdap_6 ffy_2006- ffy_2012 careerpl-MOSother afqt female Native Asian black pacisl race_na hispanic civ_educ_nohs civ_educ_sc civ_educ_coll civ_educ_ms

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note: SEA omitted because of collinearity
```

Source	SS	df	MS	Number of obs =	64267
				F(30, 64236) =	367.67
Model	137.172393	30	4.5724131	Prob > F =	0.0000
Residual	798.857193	64236	.012436285	R-squared =	0.1465
				Adj R-squared =	0.1461
Total	936.029586	64266	.014564927	Root MSE =	.11152

conduct	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
sdap_2	.0866376	.0026748	32.39	0.000	.081395	.0918801
sdap_3	.0743652	.0032488	22.89	0.000	.0679974	.0807329
sdap_4	.0898749	.005966	15.06	0.000	.0781815	.1015683
sdap_5	.083818	.0037991	22.06	0.000	.0763717	.0912642
sdap_6	.0972581	.0047813	20.34	0.000	.0878868	.1066293
ffy_2006	-.0077904	.0019361	-4.02	0.000	-.0115853	-.0039956
ffy_2007	-.0224364	.0019039	-11.78	0.000	-.026168	-.0187048
ffy_2008	-.0332403	.001898	-17.51	0.000	-.0369603	-.0295203
ffy_2009	-.0476376	.0018975	-25.11	0.000	-.0513568	-.0439185
ffy_2010	-.0568386	.0018945	-30.00	0.000	-.0605519	-.0531253
ffy_2011	-.0657597	.0018938	-34.72	0.000	-.0694716	-.0620478
ffy_2012	-.0750389	.0018937	-39.62	0.000	-.0787506	-.0713272
careerpl	-.0591771	.0054507	-10.86	0.000	-.0698606	-.0484937
DI	-.097487	.0053571	-18.20	0.000	-.107987	-.086987
CI	-.137469	.0047977	-28.65	0.000	-.1468725	-.1280655
recruiter	-.121429	.0060309	-20.13	0.000	-.1332496	-.1096084
MSG	-.1522805	.005053	-30.14	0.000	-.1621845	-.1423766
SEA	(omitted)					
MOSother	-.1114803	.0049056	-22.73	0.000	-.1210953	-.1018653
afqt	.0005465	.0000273	20.03	0.000	.000493	.0005999
female	.035881	.0021061	17.04	0.000	.031753	.040009
Native	-.0053596	.0045477	-1.18	0.239	-.014273	.0035539
Asian	.0207345	.0029991	6.91	0.000	.0148562	.0266128
black	.0199076	.0012831	15.51	0.000	.0173927	.0224226
pacisl	.0173724	.0048577	3.58	0.000	.0078512	.0268936
race_na	.0003192	.0028819	0.11	0.912	-.0053294	.0059678
hispanic	.0145915	.0011897	12.27	0.000	.0122598	.0169232
civ_educ_n~s	-.0170758	.0052544	-3.25	0.001	-.0273744	-.0067772
civ_educ_sc	.0421444	.0018821	22.39	0.000	.0384556	.0458333
civ_educ_c~l	.0566139	.0030075	18.82	0.000	.0507191	.0625086
civ_educ_ms	.0624073	.0097033	6.43	0.000	.0433888	.0814257
_cons	4.575316	.0055691	821.56	0.000	4.564401	4.586231

reg proficiency sdap_2 sdap_3 sdap_4 sdap_5 sdap_6 ffy_2006- ffy_2012 careerpl-MOSother afqt female Native Asian black pacisl race_na hispanic civ_educ_nohs civ_educ_sc civ_educ_coll civ_educ_ms

note: SEA omitted because of collinearity

Source	SS	df	MS	Number of obs =	64267
				F(30, 64236) =	448.92
Model	141.132001	30	4.70440003	Prob > F =	0.0000
Residual	673.145691	64236	.010479259	R-squared =	0.1733
				Adj R-squared =	0.1729
Total	814.277692	64266	.012670427	Root MSE =	.10237

proficiency	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
sdap_2	.084787	.0024553	34.53	0.000	.0799746	.0895994
sdap_3	.0760408	.0029823	25.50	0.000	.0701955	.0818861
sdap_4	.0890467	.0054765	16.26	0.000	.0783128	.0997807
sdap_5	.0804852	.0034874	23.08	0.000	.0736499	.0873205
sdap_6	.0938463	.004389	21.38	0.000	.0852439	.1024487
ffy_2006	-.0084265	.0017773	-4.74	0.000	-.0119099	-.004943
ffy_2007	-.0222215	.0017477	-12.71	0.000	-.0256469	-.0187961
ffy_2008	-.0336248	.0017422	-19.30	0.000	-.0370396	-.03021
ffy_2009	-.0480866	.0017418	-27.61	0.000	-.0515006	-.0446726
ffy_2010	-.0577832	.0017391	-33.23	0.000	-.0611918	-.0543745
ffy_2011	-.0674218	.0017384	-38.78	0.000	-.0708291	-.0640144
ffy_2012	-.07697	.0017384	-44.28	0.000	-.0803771	-.0735628
careerpl	-.0640513	.0050035	-12.80	0.000	-.0738582	-.0542444
DI	-.09395	.0049176	-19.10	0.000	-.1035885	-.0843114
CI	-.1424641	.0044041	-32.35	0.000	-.151096	-.1338321
recruiter	-.1186021	.0055361	-21.42	0.000	-.1294528	-.1077513
MSG	-.1576537	.0046384	-33.99	0.000	-.1667451	-.1485624
SEA	(omitted)					
MOSother	-.1106549	.0045031	-24.57	0.000	-.119481	-.1018288
afqt	.0006001	.000025	23.96	0.000	.000551	.0006492
female	.0335143	.0019333	17.34	0.000	.029725	.0373036
Native	.0001641	.0041745	0.04	0.969	-.008018	.0083462
Asian	.0164242	.0027531	5.97	0.000	.0110282	.0218202
black	.0169502	.0011779	14.39	0.000	.0146416	.0192588
pacisl	.016491	.0044592	3.70	0.000	.007751	.025231
race_na	-.0015237	.0026455	-0.58	0.565	-.0067088	.0036615
hispanic	.0138586	.0010921	12.69	0.000	.0117182	.015999
civ_educ_n~s	-.0142778	.0048233	-2.96	0.003	-.0237314	-.0048242
civ_educ_sc	.0371847	.0017276	21.52	0.000	.0337985	.0405708
civ_educ_c~l	.052022	.0027608	18.84	0.000	.0466109	.0574331
civ_educ_ms	.0720056	.0089072	8.08	0.000	.0545476	.0894637
_cons	4.581772	.0051122	896.25	0.000	4.571753	4.591792

reg pft sdap_2 sdap_3 sdap_4 sdap_5 sdap_6 ffy_2006- ffy_2012 careerpl- MOSother afqt female Native Asian black pacisl race_na hispanic civ_educ_nohs civ_educ_sc civ_educ_coll civ_educ_ms

```
note: ffy_2006 omitted because of collinearity
note: ffy_2007 omitted because of collinearity
note: ffy_2008 omitted because of collinearity
note: ffy_2009 omitted because of collinearity
note: ffy_2010 omitted because of collinearity
note: SEA omitted because of collinearity
```

Source	SS	df	MS		
Model	5271519.16	25	210860.766	Number of obs	= 25535
Residual	19802163.4	25509	776.281445	F(25, 25509)	= 271.63
				Prob > F	= 0.0000
				R-squared	= 0.2102
				Adj R-squared	= 0.2095
Total	25073682.5	25534	981.972372	Root MSE	= 27.862

pft	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
sdap_2	1.082896	.902006	1.20	0.230	-.6850877	2.850879
sdap_3	8.918417	2.019366	4.42	0.000	4.960344	12.87649
sdap_4	-1.435478	2.734657	-0.52	0.600	-6.795561	3.924604
sdap_5	17.94409	1.947411	9.21	0.000	14.12706	21.76113
sdap_6	-12.45141	2.318067	-5.37	0.000	-16.99495	-7.907862
ffy_2006	(omitted)					
ffy_2007	(omitted)					
ffy_2008	(omitted)					
ffy_2009	(omitted)					
ffy_2010	(omitted)					
ffy_2011	2.115637	.4374903	4.84	0.000	1.258131	2.973142
ffy_2012	5.474975	.435978	12.56	0.000	4.620434	6.329517
careerpl	-16.91332	2.469744	-6.85	0.000	-21.75416	-12.07248
DI	-3.631364	1.997776	-1.82	0.069	-7.547118	.2843907
CI	-4.854537	1.819673	-2.67	0.008	-8.421199	-1.287875
recruiter	-5.766436	2.340801	-2.46	0.014	-10.35454	-1.178333
MSG	3.096882	2.3595	1.31	0.189	-1.527872	7.721637
SEA	(omitted)					
MOSother	-.5288524	1.84399	-0.29	0.774	-4.143177	3.085473
afqt	-.0194714	.010712	-1.82	0.069	-.0404675	.0015247
female	3.098454	.8708479	3.56	0.000	1.391543	4.805366
Native	1.632774	1.805155	0.90	0.366	-1.905434	5.170981
Asian	7.094299	1.164412	6.09	0.000	4.811986	9.376613
black	6.87451	.5407224	12.71	0.000	5.814664	7.934357
pacisl	6.915476	1.709579	4.05	0.000	3.564604	10.26635
race_na	6.533651	1.071584	6.10	0.000	4.433285	8.634018
hispanic	7.082907	.4774634	14.83	0.000	6.147051	8.018762
civ_educ_n~s	1.742252	1.725979	1.01	0.313	-1.640765	5.125268
civ_educ_sc	1.894252	.7472056	2.54	0.011	.429686	3.358817
civ_educ_c~l	2.003128	1.078939	1.86	0.063	-.1116544	4.11791
civ_educ_ms	3.879028	3.4963	1.11	0.267	-2.973919	10.73197
_cons	254.7904	2.458726	103.63	0.000	249.9712	259.6097

reg cft sdap_2 sdap_3 sdap_4 sdap_5 sdap_6 ffy_2006- ffy_2012 careerpl- MOSother afqt female Native Asian black pacisl race_na hispanic civ_educ_nohs civ_educ_sc civ_educ_coll civ_educ_ms

```
note: ffy_2006 omitted because of collinearity
note: ffy_2007 omitted because of collinearity
note: ffy_2008 omitted because of collinearity
note: ffy_2010 omitted because of collinearity
note: recruiter omitted because of collinearity
```

Source	SS	df	MS		
Model	951577.041	26	36599.117	Number of obs	= 26414
Residual	4615419.48	26387	174.912627	F(26, 26387)	= 209.24
				Prob > F	= 0.0000
				R-squared	= 0.1709
				Adj R-squared	= 0.1701
Total	5566996.52	26413	210.767293	Root MSE	= 13.225

cft	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
sdap_2	.2811904	.4243799	0.66	0.508	-.5506171	1.112998
sdap_3	4.500015	.9392613	4.79	0.000	2.659013	6.341018
sdap_4	1.300058	1.276583	1.02	0.309	-1.202114	3.802231
sdap_5	7.549136	.9080388	8.31	0.000	5.769331	9.328941
sdap_6	-4.065522	1.067302	-3.81	0.000	-6.157491	-1.973553
ffy_2006	(omitted)					
ffy_2007	(omitted)					
ffy_2008	(omitted)					
ffy_2009	-.4129569	.460818	-0.90	0.370	-1.316185	.4902713
ffy_2010	(omitted)					
ffy_2011	4.845832	.2087089	23.22	0.000	4.436752	5.254913
ffy_2012	8.286898	.208055	39.83	0.000	7.879099	8.694697
careerpl	-3.959253	1.116622	-3.55	0.000	-6.147893	-1.770613
DI	-.796558	.7848688	-1.01	0.310	-2.334943	.7418272
CI	1.162781	.8525611	1.36	0.173	-.5082843	2.833847
recruiter	(omitted)					
MSG	2.074775	1.052258	1.97	0.049	.0122924	4.137258
SEA	3.290532	1.079904	3.05	0.002	1.173861	5.407203
MOSother	.7008404	.6880398	1.02	0.308	-.6477547	2.049436
afqt	-.0041274	.004993	-0.83	0.408	-.0139139	.0056592
female	.3351329	.4102579	0.82	0.414	-.4689947	1.139261
Native	-.0397818	.836501	-0.05	0.962	-1.679369	1.599805
Asian	-.2412896	.5416403	-0.45	0.656	-1.302934	.8203546
black	.2435098	.2514331	0.97	0.333	-.2493127	.7363322
pacisl	1.225024	.7887348	1.55	0.120	-.3209383	2.770987
race_na	.3908253	.4980012	0.78	0.433	-.5852839	1.366935
hispanic	.6906787	.2231106	3.10	0.002	.2533699	1.127987
civ_educ_n~s	-.943231	.8160428	-1.16	0.248	-2.542719	.6562569
civ_educ_sc	.6922277	.345862	2.00	0.045	.0143196	1.370136
civ_educ_c~l	1.752225	.5002158	3.50	0.000	.7717746	2.732674
civ_educ_ms	3.050014	1.659594	1.84	0.066	-.2028792	6.302908
_cons	279.7039	1.13285	246.90	0.000	277.4834	281.9243

****SDAP FY05–12 Individual FE model****

STATA COMMANDS

xtreg gct sdap_2 sdap_3 sdap_4 sdap_5 sdap_6 ffy_2006- ffy_2012 careerpl- MOSother afqt female Native Asian black pacisl race_na hispanic civ_educ_nohs civ_educ_sc civ_educ_coll civ_educ_ms, fe

```
note: CI omitted because of collinearity
note: female omitted because of collinearity
note: Native omitted because of collinearity
note: Asian omitted because of collinearity
note: black omitted because of collinearity
note: pacisl omitted because of collinearity
note: race_na omitted because of collinearity
note: hispanic omitted because of collinearity

Fixed-effects (within) regression               Number of obs      =     60133
Group variable: id                              Number of groups   =     23908

R-sq:  within  = 0.6908                         Obs per group: min =         1
       between = 0.6789                                        avg =       2.5
       overall = 0.6719                                        max =         9

                                                F(23,36202)        =   3516.88
corr(u_i, Xb)  = -0.0232                        Prob > F           =    0.0000
```

gct	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
sdap_2	.1008739	.0439369	2.30	0.022	.0147563	.1869916
sdap_3	.1633169	.0562478	2.90	0.004	.0530695	.2735644
sdap_4	.0951957	.0999053	0.95	0.341	-.1006216	.2910129
sdap_5	.1775346	.0662086	2.68	0.007	.0477638	.3073054
sdap_6	-.12478	.0831535	-1.50	0.133	-.2877632	.0382033
ffy_2006	.0281925	.0175651	1.61	0.108	-.0062357	.0626206
ffy_2007	.0441647	.0196203	2.25	0.024	.0057083	.082621
ffy_2008	.0591292	.0215735	2.74	0.006	.0168445	.1014139
ffy_2009	.0888804	.022974	3.87	0.000	.0438506	.1339101
ffy_2010	.0744938	.0238345	3.13	0.002	.0277776	.1212101
ffy_2011	.11905	.0248656	4.79	0.000	.0703128	.1677872
ffy_2012	.1393855	.0260627	5.35	0.000	.0883018	.1904691
careerpl	.1734508	.0785775	2.21	0.027	.0194366	.3274651
DI	.2052483	.082223	2.50	0.013	.0440889	.3664078
CI	(omitted)					
recruiter	.0834589	.0764323	1.09	0.275	-.0663507	.2332684
MSG	.1272785	.0802691	1.59	0.113	-.0300513	.2846083
SEA	.4733793	.1510573	3.13	0.002	.1773024	.7694561
MOSother	.1118379	.0662851	1.69	0.092	-.0180828	.2417585
afqt	.5488626	.001963	279.60	0.000	.545015	.5527102
female	(omitted)					
Native	(omitted)					
Asian	(omitted)					
black	(omitted)					
pacisl	(omitted)					
race_na	(omitted)					
hispanic	(omitted)					
civ_educ_n~s	.0564794	.3278728	0.17	0.863	-.5861609	.6991198
civ_educ_sc	.1214344	.0540855	2.25	0.025	.0154252	.2274435
civ_educ_c~l	.2592911	.0676742	3.83	0.000	.1266476	.3919346
civ_educ_ms	-.2095626	.1957153	-1.07	0.284	-.5931704	.1740452
_cons	74.52683	.1366688	545.31	0.000	74.25896	74.79471
sigma_u	6.4607237					
sigma_e	.82451026					
rho	.98397443	(fraction of variance due to u_i)				

```
F test that all u_i=0:     F(23907, 36202) =   141.75        Prob > F = 0.0000
```

xtreg merit sdap_2 sdap_3 sdap_4 sdap_5 sdap_6 ffy_2006- ffy_2012 careerpl-MOSother afqt female Native Asian black pacisl race_na hispanic civ_educ_nohs civ_educ_sc civ_educ_coll civ_educ_ms, fe

```
note: CI omitted because of collinearity
note: female omitted because of collinearity
note: Native omitted because of collinearity
note: Asian omitted because of collinearity
note: black omitted because of collinearity
note: pacisl omitted because of collinearity
note: race_na omitted because of collinearity
note: hispanic omitted because of collinearity

Fixed-effects (within) regression               Number of obs      =     64538
Group variable: id                              Number of groups   =     25326

R-sq:  within  = 0.0062                         Obs per group: min =         1
       between = 0.0001                                        avg =       2.5
       overall = 0.0001                                        max =         9

                                                F(23,39189)        =     10.61
corr(u_i, Xb)  = -0.1788                        Prob > F           =    0.0000
```

merit	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
sdap_2	.0021012	.0092418	0.23	0.820	-.0160129	.0202154
sdap_3	.0520636	.0119691	4.35	0.000	.0286039	.0755234
sdap_4	.0322857	.0211726	1.52	0.127	-.0092131	.0737845
sdap_5	.0048212	.0141525	0.34	0.733	-.022918	.0325603
sdap_6	.0115426	.0168883	0.68	0.494	-.0215589	.0446441
ffy_2006	.0080375	.0036709	2.19	0.029	.0008425	.0152325
ffy_2007	.0129831	.0040974	3.17	0.002	.004952	.0210141
ffy_2008	.0138197	.0045049	3.07	0.002	.00499	.0226495
ffy_2009	.0191956	.0047954	4.00	0.000	.0097965	.0285947
ffy_2010	.0285178	.0049766	5.73	0.000	.0187635	.0382721
ffy_2011	.0326104	.0051993	6.27	0.000	.0224196	.0428012
ffy_2012	.033876	.0054676	6.20	0.000	.0231593	.0445927
careerpl	.063682	.016768	3.80	0.000	.0308163	.0965476
DI	.048889	.0176956	2.76	0.006	.0142052	.0835728
CI	(omitted)					
recruiter	.0576087	.0162741	3.54	0.000	.0257111	.0895064
MSG	.0755093	.0173877	4.34	0.000	.0414291	.1095896
SEA	-.0877758	.0299336	-2.93	0.003	-.1464464	-.0291052
MOSother	.0856765	.0142427	6.02	0.000	.0577604	.1135926
afqt	.0016564	.0004318	3.84	0.000	.0008101	.0025027
female	(omitted)					
Native	(omitted)					
Asian	(omitted)					
black	(omitted)					
pacisl	(omitted)					
race_na	(omitted)					
hispanic	(omitted)					
civ_educ_n~s	.0229821	.0733459	0.31	0.754	-.1207776	.1667418
civ_educ_sc	-.0419553	.0114652	-3.66	0.000	-.0644274	-.0194832
civ_educ_c~l	.0052886	.0143582	0.37	0.713	-.0228539	.0334311
civ_educ_ms	-.068702	.0409108	-1.68	0.093	-.1488881	.0114842
_cons	-.1041004	.0297718	-3.50	0.000	-.1624539	-.0457469
sigma_u	.23615719					
sigma_e	.18445737					
rho	.62108558	(fraction of variance due to u_i)				

```
F test that all u_i=0:     F(25325, 39189) =     3.76        Prob > F = 0.0000
```

xtreg conduct sdap_2 sdap_3 sdap_4 sdap_5 sdap_6 ffy_2006- ffy_2012 careerpl-MOSother afqt female Native Asian black pacisl race_na hispanic civ_educ_nohs civ_educ_sc civ_educ_coll civ_educ_ms, fe

```
note: CI omitted because of collinearity
note: female omitted because of collinearity
note: Native omitted because of collinearity
note: Asian omitted because of collinearity
note: black omitted because of collinearity
note: pacisl omitted because of collinearity
note: race_na omitted because of collinearity
note: hispanic omitted because of collinearity

Fixed-effects (within) regression               Number of obs      =     64267
Group variable: id                              Number of groups   =     25220

R-sq:  within  = 0.0026                         Obs per group: min =         1
       between = 0.0250                                        avg =       2.5
       overall = 0.0192                                        max =         9

                                                F(23,39024)        =      4.41
corr(u_i, Xb)  = -0.1713                        Prob > F           =    0.0000
```

conduct	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
sdap_2	.0010083	.001071	0.94	0.346	-.0010909	.0031076
sdap_3	.0026564	.0013854	1.92	0.055	-.000059	.0053718
sdap_4	.002129	.0024471	0.87	0.384	-.0026675	.0069254
sdap_5	.0039039	.0016376	2.38	0.017	.0006943	.0071136
sdap_6	.0039173	.001981	1.98	0.048	.0000344	.0078001
ffy_2006	.0003614	.0004252	0.85	0.395	-.000472	.0011948
ffy_2007	.000223	.0004747	0.47	0.638	-.0007074	.0011534
ffy_2008	.0001795	.0005223	0.34	0.731	-.0008442	.0012033
ffy_2009	.0009823	.000556	1.77	0.077	-.0001074	.0020721
ffy_2010	.0010726	.0005769	1.86	0.063	-.0000582	.0022033
ffy_2011	.0010829	.0006027	1.80	0.072	-.0000984	.0022642
ffy_2012	.0017206	.0006339	2.71	0.007	.0004781	.0029631
careerpl	-.0071329	.0019406	-3.68	0.000	-.0109364	-.0033293
DI	-.0062739	.0020457	-3.07	0.002	-.0102835	-.0022643
CI	(omitted)					
recruiter	-.0064917	.0018846	-3.44	0.001	-.0101856	-.0027978
MSG	.0030204	.0020087	1.50	0.133	-.0009166	.0069575
SEA	-.004654	.0034582	-1.35	0.178	-.0114322	.0021241
MOSother	-.0075029	.001646	-4.56	0.000	-.010729	-.0042767
afqt	.0001186	.00005	2.37	0.018	.0000207	.0002165
female	(omitted)					
Native	(omitted)					
Asian	(omitted)					
black	(omitted)					
pacisl	(omitted)					
race_na	(omitted)					
hispanic	(omitted)					
civ_educ_n~s	-.0133872	.008473	-1.58	0.114	-.0299946	.0032201
civ_educ_sc	-.0010669	.0013261	-0.80	0.421	-.003666	.0015322
civ_educ_c~l	.0008254	.0016624	0.50	0.620	-.0024331	.0040838
civ_educ_ms	-.0002267	.0047267	-0.05	0.962	-.0094912	.0090378
_cons	4.540339	.0034432	1318.65	0.000	4.533591	4.547088
sigma_u	.12518762					
sigma_e	.02130874					
rho	.97184285	(fraction of variance due to u_i)				

```
F test that all u_i=0:     F(25219, 39024) =    68.22        Prob > F = 0.0000
```

xtreg proficiency sdap_2 sdap_3 sdap_4 sdap_5 sdap_6 ffy_2006- ffy_2012 careerpl-MOSother afqt female Native Asian black pacisl race_na hispanic civ_educ_nohs civ_educ_sc civ_educ_coll civ_educ_ms, fe

```
note: CI omitted because of collinearity
note: female omitted because of collinearity
note: Native omitted because of collinearity
note: Asian omitted because of collinearity
note: black omitted because of collinearity
note: pacisl omitted because of collinearity
note: race_na omitted because of collinearity
note: hispanic omitted because of collinearity

Fixed-effects (within) regression               Number of obs      =     64267
Group variable: id                              Number of groups   =     25220

R-sq:  within  = 0.0029                         Obs per group: min =         1
       between = 0.0393                                        avg =       2.5
       overall = 0.0289                                        max =         9

                                                F(23,39024)        =      4.99
corr(u_i, Xb)  = -0.1983                        Prob > F           =    0.0000
```

proficiency	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
sdap_2	.0008623	.0009642	0.89	0.371	-.0010275	.002752
sdap_3	.0029842	.0012471	2.39	0.017	.0005398	.0054287
sdap_4	.0034466	.0022029	1.56	0.118	-.0008712	.0077643
sdap_5	.0055965	.0014741	3.80	0.000	.0027072	.0084859
sdap_6	.003817	.0017833	2.14	0.032	.0003216	.0073123
ffy_2006	.000949	.0003828	2.48	0.013	.0001988	.0016993
ffy_2007	.0010712	.0004273	2.51	0.012	.0002336	.0019087
ffy_2008	.0009403	.0004702	2.00	0.046	.0000188	.0018619
ffy_2009	.0014682	.0005005	2.93	0.003	.0004872	.0024492
ffy_2010	.001992	.0005193	3.84	0.000	.0009741	.0030099
ffy_2011	.0018179	.0005426	3.35	0.001	.0007544	.0028813
ffy_2012	.0028475	.0005706	4.99	0.000	.001729	.003966
careerpl	-.0052915	.0017469	-3.03	0.002	-.0087155	-.0018676
DI	-.0043987	.0018415	-2.39	0.017	-.0080081	-.0007892
CI	(omitted)					
recruiter	-.0046744	.0016965	-2.76	0.006	-.0079996	-.0013491
MSG	.0039278	.0018082	2.17	0.030	.0003836	.007472
SEA	-.0030427	.0031131	-0.98	0.328	-.0091444	.003059
MOSother	-.0053471	.0014817	-3.61	0.000	-.0082513	-.0024429
afqt	.0000796	.000045	1.77	0.077	-8.58e-06	.0001677
female	(omitted)					
Native	(omitted)					
Asian	(omitted)					
black	(omitted)					
pacisl	(omitted)					
race_na	(omitted)					
hispanic	(omitted)					
civ_educ_n~s	-.0105226	.0076274	-1.38	0.168	-.0254726	.0044274
civ_educ_sc	-.0008713	.0011937	-0.73	0.465	-.003211	.0014685
civ_educ_c~l	.0000761	.0014965	0.05	0.959	-.0028572	.0030093
civ_educ_ms	-.0009783	.004255	-0.23	0.818	-.0093182	.0073616
_cons	4.545686	.0030996	1466.55	0.000	4.53961	4.551761
sigma_u	.11628454					
sigma_e	.01918222					
rho	.97350928	(fraction of variance due to u_i)				

```
F test that all u_i=0:     F(25219, 39024) =    70.99        Prob > F = 0.0000
```

xtreg pft sdap_2 sdap_3 sdap_4 sdap_5 sdap_6 ffy_2006- ffy_2012 careerpl- MOSother afqt female Native Asian black pacisl race_na hispanic civ_educ_nohs civ_educ_sc civ_educ_coll civ_educ_ms, fe

```
note: ffy_2006 omitted because of collinearity
note: ffy_2007 omitted because of collinearity
note: ffy_2008 omitted because of collinearity
note: ffy_2009 omitted because of collinearity
note: ffy_2012 omitted because of collinearity
note: SEA omitted because of collinearity
note: female omitted because of collinearity
note: Native omitted because of collinearity
note: Asian omitted because of collinearity
note: black omitted because of collinearity
note: pacisl omitted because of collinearity
note: race_na omitted because of collinearity
note: hispanic omitted because of collinearity

Fixed-effects (within) regression               Number of obs      =     25535
Group variable: id                              Number of groups   =     14317

R-sq:  within  = 0.0027                         Obs per group: min =         1
       between = 0.0616                                        avg =       1.8
       overall = 0.0595                                        max =         4

                                                F(18,11200)        =      1.66
corr(u_i, Xb)  = -0.3479                        Prob > F           =    0.0384
```

pft	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
sdap_2	.7653812	1.037609	0.74	0.461	-1.268515	2.799277
sdap_3	1.991729	4.39919	0.45	0.651	-6.631458	10.61492
sdap_4	2.781559	5.585774	0.50	0.619	-8.16754	13.73066
sdap_5	1.935812	4.341536	0.45	0.656	-6.574361	10.44599
sdap_6	7.366631	4.674668	1.58	0.115	-1.796541	16.5298
ffy_2006	(omitted)					
ffy_2007	(omitted)					
ffy_2008	(omitted)					
ffy_2009	(omitted)					
ffy_2010	-.7457154	.3115476	-2.39	0.017	-1.356403	-.1350274
ffy_2011	-1.082883	.2601988	-4.16	0.000	-1.592919	-.572848
ffy_2012	(omitted)					
careerpl	4.979653	7.187108	0.69	0.488	-9.108342	19.06765
DI	3.070883	6.33665	0.48	0.628	-9.350064	15.49183
CI	2.710498	6.74637	0.40	0.688	-10.51357	15.93457
recruiter	.8115383	6.385349	0.13	0.899	-11.70487	13.32795
MSG	2.810521	6.445062	0.44	0.663	-9.822934	15.44398
SEA	(omitted)					
MOSother	2.013674	6.255761	0.32	0.748	-10.24872	14.27607
afqt	-.0124816	.0823051	-0.15	0.879	-.173814	.1488509
female	(omitted)					
Native	(omitted)					
Asian	(omitted)					
black	(omitted)					
pacisl	(omitted)					
race_na	(omitted)					
hispanic	(omitted)					
civ_educ_n~s	-19.36972	13.03127	-1.49	0.137	-44.91329	6.173849
civ_educ_sc	.1789112	1.835138	0.10	0.922	-3.418283	3.776105
civ_educ_c~l	-6.092323	2.553795	-2.39	0.017	-11.09821	-1.086436
civ_educ_ms	-3.711103	5.794123	-0.64	0.522	-15.0686	7.646396
_cons	251.3915	8.54333	29.43	0.000	234.6451	268.138
sigma_u	31.508161					
sigma_e	14.050983					
rho	.83411941	(fraction of variance due to u_i)				

```
F test that all u_i=0:     F(14316, 11200) =     6.22        Prob > F = 0.0000
```

xtreg cft sdap_2 sdap_3 sdap_4 sdap_5 sdap_6 ffy_2006- ffy_2012 careerpl- MOSother afqt female Native Asian black pacisl race_na hispanic civ_educ_nohs civ_educ_sc civ_educ_coll civ_educ_ms, fe

```
note: ffy_2006 omitted because of collinearity
note: ffy_2007 omitted because of collinearity
note: ffy_2008 omitted because of collinearity
note: ffy_2009 omitted because of collinearity
note: SEA omitted because of collinearity
note: female omitted because of collinearity
note: Native omitted because of collinearity
note: Asian omitted because of collinearity
note: black omitted because of collinearity
note: pacisl omitted because of collinearity
note: race_na omitted because of collinearity
note: hispanic omitted because of collinearity

Fixed-effects (within) regression               Number of obs      =     26414
Group variable: id                              Number of groups   =     14533

R-sq:  within  = 0.0809                         Obs per group: min =         1
       between = 0.1056                                        avg =       1.8
       overall = 0.0839                                        max =         5

                                                F(19,11862)        =     54.92
corr(u_i, Xb)  = 0.1118                         Prob > F           =    0.0000
```

cft	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
sdap_2	.3690832	.6233207	0.59	0.554	-.8527275	1.590894
sdap_3	.912443	2.52023	0.36	0.717	-4.027621	5.852507
sdap_4	-.0916724	3.145934	-0.03	0.977	-6.258219	6.074874
sdap_5	.7946797	2.495268	0.32	0.750	-4.096454	5.685814
sdap_6	1.720602	2.686795	0.64	0.522	-3.545956	6.98716
ffy_2006	(omitted)					
ffy_2007	(omitted)					
ffy_2008	(omitted)					
ffy_2009	(omitted)					
ffy_2010	.9852975	.4223916	2.33	0.020	.1573407	1.813254
ffy_2011	4.443029	.4343287	10.23	0.000	3.591674	5.294385
ffy_2012	6.607306	.4466912	14.79	0.000	5.731717	7.482894
careerpl	-1.565652	3.901646	-0.40	0.688	-9.213518	6.082214
DI	.2245938	3.437694	0.07	0.948	-6.513851	6.963038
CI	.7196061	3.717243	0.19	0.847	-6.5668	8.006012
recruiter	-1.908688	3.476699	-0.55	0.583	-8.723589	4.906212
MSG	1.864457	3.525353	0.53	0.597	-5.045814	8.774728
SEA	(omitted)					
MOSother	-.2914498	3.395912	-0.09	0.932	-6.947994	6.365094
afqt	.0397125	.0471203	0.84	0.399	-.0526509	.132076
female	(omitted)					
Native	(omitted)					
Asian	(omitted)					
black	(omitted)					
pacisl	(omitted)					
race_na	(omitted)					
hispanic	(omitted)					
civ_educ_n~s	-4.973009	8.58395	-0.58	0.562	-21.79896	11.85294
civ_educ_sc	-.8646465	1.084498	-0.80	0.425	-2.990441	1.261148
civ_educ_c~l	1.682184	1.431004	1.18	0.240	-1.122819	4.487187
civ_educ_ms	3.300899	3.219294	1.03	0.305	-3.009446	9.611243
_cons	277.996	4.712942	58.99	0.000	268.7579	287.2342
sigma_u	13.255246					
sigma_e	8.5477956					
rho	.70629143	(fraction of variance due to u_i)				

```
F test that all u_i=0:     F(14532, 11862) =     3.53        Prob > F = 0.0000
```

****SDAP FY05–12 Billet FE model w/AFQT****

STATA COMMANDS

iis BMOS_1

tis fy

xi: xtreg merit i.fy DI CI MSG SEA MOSother female afqt Native Asian black pacisl race_na hispanic sdap_1 sdap_2 sdap_3 sdap_4 sdap_5 sdap_6, fe

```
i.fy              _Ify_2005-2012      (naturally coded; _Ify_2005 omitted)
note: DI omitted because of collinearity
note: CI omitted because of collinearity
note: MSG omitted because of collinearity
note: SEA omitted because of collinearity
note: MOSother omitted because of collinearity
note: sdap_1 omitted because of collinearity

Fixed-effects (within) regression               Number of obs      =       511
Group variable: BMOS_1                          Number of groups   =       167

R-sq:  within  = 0.0584                         Obs per group: min =         1
       between = 0.0173                                        avg =       3.1
       overall = 0.0403                                        max =         8

                                                F(20,324)          =      1.00
corr(u_i, Xb)  = -0.0602                        Prob > F           =    0.4559

------------------------------------------------------------------------------
       merit |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   _Ify_2006 |   .0180295   .0437468     0.41   0.681    -.0680342    .1040933
   _Ify_2007 |   .0097123     .04706     0.21   0.837    -.0828695    .1022942
   _Ify_2008 |  -.0143848   .0447612    -0.32   0.748    -.1024442    .0736745
   _Ify_2009 |  -.0157892   .0459668    -0.34   0.731    -.1062202    .0746418
   _Ify_2010 |   .0512768   .0452898     1.13   0.258    -.0378224    .1403761
   _Ify_2011 |   .0399638   .0455932     0.88   0.381    -.0497323    .1296598
   _Ify_2012 |   -.002788   .0469066    -0.06   0.953     -.095068     .089492
          DI |  (omitted)
          CI |  (omitted)
         MSG |  (omitted)
         SEA |  (omitted)
    MOSother |  (omitted)
      female |   .0140955   .0584038     0.24   0.809     -.100803    .1289941
        afqt |  -.0005992   .0010273    -0.58   0.560    -.0026203    .0014219
      Native |  -.0366929    .142552    -0.26   0.797    -.3171373    .2437515
       Asian |  -.1277996   .1125142    -1.14   0.257    -.3491501    .0935509
       black |  -.0334649   .0497625    -0.67   0.502    -.1313634    .0644335
      pacisl |  -.0569531   .1519858    -0.37   0.708    -.3559567    .2420505
     race_na |   .0944592   .1198279     0.79   0.431    -.1412797    .3301982
    hispanic |  -.0563012     .04225    -1.33   0.184    -.1394201    .0268178
      sdap_1 |  (omitted)
      sdap_2 |   .0471778   .0788603     0.60   0.550    -.1079652    .2023207
      sdap_3 |   .1234012   .0839575     1.47   0.143    -.0417694    .2885718
      sdap_4 |  -.0655908   .1023191    -0.64   0.522    -.2668845    .1357028
      sdap_5 |   .0658864   .0748439     0.88   0.379    -.0813549    .2131276
      sdap_6 |   .1061537   .0764826     1.39   0.166    -.0443116    .2566189
       _cons |   .0449213   .0987975     0.45   0.650    -.1494443     .239287
-------------+----------------------------------------------------------------
     sigma_u |  .16310739
     sigma_e |  .18474337
         rho |  .43804065   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0:     F(166, 324) =     1.44                 Prob > F = 0.0031
```

xi: xtreg gct i.fy DI CI MSG SEA MOSother female afqt Native Asian black pacisl race_na hispanic sdap_1 sdap_2 sdap_3 sdap_4 sdap_5 sdap_6, fe

```
i.fy              _Ify_2005-2012      (naturally coded; _Ify_2005 omitted)
note: DI omitted because of collinearity
note: CI omitted because of collinearity
note: MSG omitted because of collinearity
note: SEA omitted because of collinearity
note: MOSother omitted because of collinearity
note: sdap_1 omitted because of collinearity

Fixed-effects (within) regression               Number of obs      =       483
Group variable: BMOS_1                          Number of groups   =       163

R-sq:  within  = 0.5480                         Obs per group: min =         1
       between = 0.7114                                        avg =       3.0
       overall = 0.6624                                        max =         8

                                                F(20,300)          =     18.19
corr(u_i, Xb)  = 0.0584                         Prob > F           =    0.0000
```

gct	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
_Ify_2006	-3.139256	1.164619	-2.70	0.007	-5.431114	-.8473988
_Ify_2007	-.9938553	1.246619	-0.80	0.426	-3.44708	1.45937
_Ify_2008	-2.304492	1.176197	-1.96	0.051	-4.619134	.0101502
_Ify_2009	-1.761473	1.208447	-1.46	0.146	-4.139579	.6166341
_Ify_2010	-2.396263	1.198055	-2.00	0.046	-4.75392	-.0386059
_Ify_2011	-3.016126	1.206886	-2.50	0.013	-5.39116	-.6410917
_Ify_2012	-2.117544	1.242859	-1.70	0.089	-4.56337	.3282815
DI	(omitted)					
CI	(omitted)					
MSG	(omitted)					
SEA	(omitted)					
MOSother	(omitted)					
female	-4.828677	1.5457	-3.12	0.002	-7.870466	-1.786889
afqt	.4739625	.0282753	16.76	0.000	.4183195	.5296055
Native	-.6883571	4.969336	-0.14	0.890	-10.46753	9.090815
Asian	-2.405173	2.90011	-0.83	0.408	-8.112308	3.301961
black	-2.739274	1.408854	-1.94	0.053	-5.511763	.0332141
pacisl	-4.360674	3.879659	-1.12	0.262	-11.99547	3.274118
race_na	5.596703	3.432133	1.63	0.104	-1.157403	12.35081
hispanic	-.7406201	1.111678	-0.67	0.506	-2.928296	1.447055
sdap_1	(omitted)					
sdap_2	-3.634584	2.115878	-1.72	0.087	-7.798427	.5292598
sdap_3	-5.035878	2.221497	-2.27	0.024	-9.407568	-.6641872
sdap_4	4.378782	3.049057	1.44	0.152	-1.621467	10.37903
sdap_5	-2.781741	2.041998	-1.36	0.174	-6.800195	1.236713
sdap_6	-3.908241	2.106412	-1.86	0.065	-8.053457	.2369743
_cons	86.16737	2.669242	32.28	0.000	80.91457	91.42018
sigma_u	4.7695679					
sigma_e	4.6864708					
rho	.50878705	(fraction of variance due to u_i)				

```
F test that all u_i=0:     F(162, 300) =     1.68            Prob > F = 0.0001
```

xi: xtreg proficiency i.fy DI CI MSG SEA MOSother female afqt Native Asian black pacisl race_na hispanic sdap_1 sdap_2 sdap_3 sdap_4 sdap_5 sdap_6, fe

```
i.fy              _Ify_2005-2012      (naturally coded; _Ify_2005 omitted)
note: DI omitted because of collinearity
note: CI omitted because of collinearity
note: MSG omitted because of collinearity
note: SEA omitted because of collinearity
note: MOSother omitted because of collinearity
note: sdap_1 omitted because of collinearity

Fixed-effects (within) regression               Number of obs      =       511
Group variable: BMOS_1                          Number of groups   =       167

R-sq:  within  = 0.1326                         Obs per group: min =         1
       between = 0.0469                                        avg =       3.1
       overall = 0.0773                                        max =         8

                                                F(20,324)          =      2.48
corr(u_i, Xb)  = -0.1596                        Prob > F           =    0.0005
```

proficiency	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
_Ify_2006	-.0160136	.0212768	-0.75	0.452	-.0578717	.0258445
_Ify_2007	.0254796	.0228882	1.11	0.266	-.0195486	.0705079
_Ify_2008	-.0190754	.0217701	-0.88	0.382	-.0619041	.0237533
_Ify_2009	-.0324065	.0223565	-1.45	0.148	-.0763886	.0115757
_Ify_2010	-.040222	.0220272	-1.83	0.069	-.0835564	.0031125
_Ify_2011	-.0455961	.0221748	-2.06	0.041	-.0892208	-.0019714
_Ify_2012	-.0345396	.0228136	-1.51	0.131	-.079421	.0103419
DI	(omitted)					
CI	(omitted)					
MSG	(omitted)					
SEA	(omitted)					
MOSother	(omitted)					
female	-.0049156	.0284054	-0.17	0.863	-.0607979	.0509667
afqt	-.0004828	.0004996	-0.97	0.335	-.0014657	.0005002
Native	-.1056388	.0693319	-1.52	0.129	-.2420363	.0307586
Asian	.0164145	.0547226	0.30	0.764	-.0912419	.124071
black	-.0676054	.0242026	-2.79	0.006	-.1152195	-.0199914
pacisl	-.0851595	.0739201	-1.15	0.250	-.2305834	.0602644
race_na	.026437	.0582797	0.45	0.650	-.0882174	.1410915
hispanic	-.0268512	.0205488	-1.31	0.192	-.0672771	.0135747
sdap_1	(omitted)					
sdap_2	.0966849	.0383546	2.52	0.012	.0212293	.1721405
sdap_3	.1104423	.0408337	2.70	0.007	.0301096	.1907749
sdap_4	.1884309	.0497641	3.79	0.000	.0905294	.2863325
sdap_5	.1435469	.0364012	3.94	0.000	.0719344	.2151594
sdap_6	.0858509	.0371982	2.31	0.022	.0126703	.1590314
_cons	4.531719	.0480513	94.31	0.000	4.437187	4.626251
sigma_u	.08924921					
sigma_e	.08985211					
rho	.49663376	(fraction of variance due to u_i)				

```
F test that all u_i=0:     F(166, 324) =     1.91                     Prob > F = 0.0000
```

xi: xtreg conduct i.fy DI CI MSG SEA MOSother female afqt Native Asian black pacisl race_na hispanic sdap_1 sdap_2 sdap_3 sdap_4 sdap_5 sdap_6, fe

```
i.fy              _Ify_2005-2012      (naturally coded; _Ify_2005 omitted)
note: DI omitted because of collinearity
note: CI omitted because of collinearity
note: MSG omitted because of collinearity
note: SEA omitted because of collinearity
note: MOSother omitted because of collinearity
note: sdap_1 omitted because of collinearity

Fixed-effects (within) regression               Number of obs      =       511
Group variable: BMOS_1                          Number of groups   =       167

R-sq:  within  = 0.0854                         Obs per group: min =         1
       between = 0.0251                                        avg =       3.1
       overall = 0.0504                                        max =         8

                                                F(20,324)          =      1.51
corr(u_i, Xb)  = -0.1388                        Prob > F           =    0.0746
```

conduct	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
_Ify_2006	-.0120367	.0276221	-0.44	0.663	-.0663779	.0423046
_Ify_2007	.0321198	.029714	1.08	0.281	-.026337	.0905767
_Ify_2008	-.0282141	.0282626	-1.00	0.319	-.0838153	.0273872
_Ify_2009	-.0320349	.0290237	-1.10	0.271	-.0891337	.0250639
_Ify_2010	-.0373247	.0285963	-1.31	0.193	-.0935826	.0189332
_Ify_2011	-.0413319	.0287879	-1.44	0.152	-.0979666	.0153028
_Ify_2012	-.0271313	.0296172	-0.92	0.360	-.0853975	.031135
DI	(omitted)					
CI	(omitted)					
MSG	(omitted)					
SEA	(omitted)					
MOSother	(omitted)					
female	-.029229	.0368766	-0.79	0.429	-.1017767	.0433188
afqt	-.0006728	.0006487	-1.04	0.300	-.0019489	.0006033
Native	-.065441	.0900083	-0.73	0.468	-.2425156	.1116336
Asian	.0768791	.0710422	1.08	0.280	-.0628832	.2166414
black	-.0407258	.0314204	-1.30	0.196	-.1025396	.0210879
pacisl	-.0291537	.0959649	-0.30	0.761	-.2179466	.1596393
race_na	.0548913	.0756602	0.73	0.469	-.0939559	.2037385
hispanic	-.0297932	.0266769	-1.12	0.265	-.0822751	.0226886
sdap_1	(omitted)					
sdap_2	.1345647	.049793	2.70	0.007	.0366064	.232523
sdap_3	.1784215	.0530113	3.37	0.001	.0741316	.2827113
sdap_4	.1998892	.064605	3.09	0.002	.0727909	.3269874
sdap_5	.1907563	.0472569	4.04	0.000	.0977872	.2837255
sdap_6	.1395441	.0482917	2.89	0.004	.0445393	.2345489
_cons	4.487162	.0623815	71.93	0.000	4.364438	4.609886
sigma_u	.10591212					
sigma_e	.11664825					
rho	.4518728	(fraction of variance due to u_i)				

```
F test that all u_i=0:     F(166, 324) =     1.64                 Prob > F = 0.0001
```

xi: xtreg pft i.fy DI CI MSG SEA MOSother female afqt Native Asian black pacisl race_na hispanic sdap_1 sdap_2 sdap_3 sdap_4 sdap_5 sdap_6, fe

```
i.fy              _Ify_2005-2012      (naturally coded; _Ify_2005 omitted)
note: _Ify_2006 omitted because of collinearity
note: _Ify_2007 omitted because of collinearity
note: _Ify_2008 omitted because of collinearity
note: _Ify_2009 omitted because of collinearity
note: _Ify_2011 omitted because of collinearity
note: DI omitted because of collinearity
note: CI omitted because of collinearity
note: MSG omitted because of collinearity
note: SEA omitted because of collinearity
note: MOSother omitted because of collinearity
note: sdap_4 omitted because of collinearity

Fixed-effects (within) regression               Number of obs      =       206
Group variable: BMOS_1                          Number of groups   =       113

R-sq:  within  = 0.5122                         Obs per group: min =         1
       between = 0.0602                                        avg =       1.8
       overall = 0.1188                                        max =         3

                                                F(15,78)           =      5.46
corr(u_i, Xb)  = -0.7329                        Prob > F           =    0.0000

------------------------------------------------------------------------------
         pft |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   _Ify_2006 |  (omitted)
   _Ify_2007 |  (omitted)
   _Ify_2008 |  (omitted)
   _Ify_2009 |  (omitted)
   _Ify_2010 |  -4.256268    3.14396    -1.35   0.180    -10.51541    2.002877
   _Ify_2011 |  (omitted)
   _Ify_2012 |   2.158552   3.725925     0.58   0.564    -5.259195      9.5763
          DI |  (omitted)
          CI |  (omitted)
         MSG |  (omitted)
         SEA |  (omitted)
    MOSother |  (omitted)
      female |  -9.400945   8.913347    -1.05   0.295    -27.14605    8.344166
        afqt |   .3844325    .191056     2.01   0.048     .0040692    .7647957
      Native |   8.974454     19.503     0.46   0.647    -29.85304    47.80195
       Asian |   32.81927   17.06021     1.92   0.058    -1.145002    66.78355
       black |   40.11164   9.303054     4.31   0.000     21.59068     58.6326
      pacisl |   30.54251   23.18957     1.32   0.192    -15.62438    76.70941
     race_na |  -27.83231   33.06947    -0.84   0.403    -93.66858    38.00396
    hispanic |   31.80406   7.363288     4.32   0.000     17.14488    46.46324
      sdap_1 |   158.3244   140.3676     1.13   0.263     -121.126    437.7748
      sdap_2 |   163.9577    140.367     1.17   0.246    -115.4914    443.4068
      sdap_3 |   163.2177   139.1952     1.17   0.245    -113.8987    440.3341
      sdap_4 |  (omitted)
      sdap_5 |   167.1827   139.3048     1.20   0.234    -110.1519    444.5172
      sdap_6 |   134.2277   138.9941     0.97   0.337    -142.4884    410.9438
       _cons |   73.26606   135.4822     0.54   0.590    -196.4583    342.9904
-------------+----------------------------------------------------------------
     sigma_u |  34.520797
     sigma_e |  15.195493
         rho |  .83768811   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0:     F(112, 78) =     2.91                 Prob > F = 0.0000
```

xi: xtreg cft i.fy DI CI MSG SEA MOSother female afqt Native Asian black pacisl race_na hispanic sdap_1 sdap_2 sdap_3 sdap_4 sdap_5 sdap_6, fe

```
i.fy              _Ify_2005-2012      (naturally coded; _Ify_2005 omitted)
note: _Ify_2006 omitted because of collinearity
note: _Ify_2007 omitted because of collinearity
note: _Ify_2008 omitted because of collinearity
note: _Ify_2012 omitted because of collinearity
note: DI omitted because of collinearity
note: CI omitted because of collinearity
note: MSG omitted because of collinearity
note: SEA omitted because of collinearity
note: MOSother omitted because of collinearity
note: sdap_4 omitted because of collinearity

Fixed-effects (within) regression               Number of obs      =       230
Group variable: BMOS_1                          Number of groups   =       114

R-sq:  within  = 0.3737                         Obs per group: min =         1
       between = 0.0512                                        avg =       2.0
       overall = 0.1172                                        max =         4

                                                F(16,100)          =      3.73
corr(u_i, Xb)  = -0.2850                        Prob > F           =    0.0000
```

cft	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
_Ify_2006	(omitted)					
_Ify_2007	(omitted)					
_Ify_2008	(omitted)					
_Ify_2009	-11.97383	2.98474	-4.01	0.000	-17.89547	-6.052194
_Ify_2010	-9.615517	2.268952	-4.24	0.000	-14.11705	-5.113981
_Ify_2011	-2.948624	2.339271	-1.26	0.210	-7.58967	1.692423
_Ify_2012	(omitted)					
DI	(omitted)					
CI	(omitted)					
MSG	(omitted)					
SEA	(omitted)					
MOSother	(omitted)					
female	1.917775	5.809941	0.33	0.742	-9.608982	13.44453
afqt	-.0494121	.1145589	-0.43	0.667	-.2766938	.1778695
Native	-5.575447	12.28722	-0.45	0.651	-29.95294	18.80204
Asian	-13.48265	9.462287	-1.42	0.157	-32.25556	5.290256
black	-3.102858	5.642214	-0.55	0.584	-14.29685	8.091134
pacisl	61.85412	14.54899	4.25	0.000	32.98934	90.71889
race_na	-1.759965	20.64557	-0.09	0.932	-42.72019	39.20027
hispanic	-.8420912	4.470287	-0.19	0.851	-9.711014	8.026831
sdap_1	15.32083	77.28356	0.20	0.843	-138.0076	168.6492
sdap_2	20.89319	77.18604	0.27	0.787	-132.2417	174.0281
sdap_3	17.04827	76.75599	0.22	0.825	-135.2334	169.33
sdap_4	(omitted)					
sdap_5	21.51716	76.7561	0.28	0.780	-130.7648	173.7991
sdap_6	24.55196	76.67087	0.32	0.749	-127.5609	176.6648
_cons	272.3161	74.71089	3.64	0.000	124.0918	420.5404
sigma_u	11.436134					
sigma_e	9.6888366					
rho	.5821504	(fraction of variance due to u_i)				

```
F test that all u_i=0:     F(113, 100) =     1.48           Prob > F = 0.0223
```

****SDAP FY05–12 Billet FE model w/o AFQT****

STATA COMMANDS

xi: xtreg merit i.fy DI CI MSG SEA MOSother female Native Asian black pacisl race_na hispanic sdap_1 sdap_2 sdap_3 sdap_4 sdap_5 sdap_6, fe

```
i.fy              _Ify_2005-2012     (naturally coded; _Ify_2005 omitted)
note: DI omitted because of collinearity
note: CI omitted because of collinearity
note: MSG omitted because of collinearity
note: SEA omitted because of collinearity
note: MOSother omitted because of collinearity
note: sdap_1 omitted because of collinearity

Fixed-effects (within) regression               Number of obs      =       511
Group variable: BMOS_1                          Number of groups   =       167

R-sq:  within  = 0.0574                         Obs per group: min =         1
       between = 0.0192                                        avg =       3.1
       overall = 0.0400                                        max =         8

                                                F(19,325)          =      1.04
corr(u_i, Xb)  = -0.0559                        Prob > F           =    0.4120

------------------------------------------------------------------------------
       merit |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   _Ify_2006 |   .0170201   .0436682     0.39   0.697    -.0688879    .1029281
   _Ify_2007 |   .0102812   .0470022     0.22   0.827    -.0821856    .1027481
   _Ify_2008 |  -.0143726   .0447158    -0.32   0.748    -.1023415    .0735963
   _Ify_2009 |  -.0152258   .0459099    -0.33   0.740     -.105544    .0750924
   _Ify_2010 |    .052439      .0452     1.16   0.247    -.0364825    .1413606
   _Ify_2011 |   .0399619   .0455469     0.88   0.381     -.049642    .1295658
   _Ify_2012 |  -.0031903   .0468539    -0.07   0.946    -.0953656    .0889849
          DI |  (omitted)
          CI |  (omitted)
         MSG |  (omitted)
         SEA |  (omitted)
    MOSother |  (omitted)
      female |   .0146034    .058338     0.25   0.802    -.1001644    .1293712
      Native |  -.0397085   .1423135    -0.28   0.780    -.3196806    .2402635
       Asian |  -.1274429   .1123982    -1.13   0.258    -.3485629     .093677
       black |  -.0230929   .0464294    -0.50   0.619     -.114433    .0682471
      pacisl |  -.0494709   .1512896    -0.33   0.744    -.3471014    .2481597
     race_na |    .097371   .1196023     0.81   0.416    -.1379214    .3326633
    hispanic |  -.0508072   .0411448    -1.23   0.218    -.1317509    .0301364
      sdap_1 |  (omitted)
      sdap_2 |   .0420016   .0782798     0.54   0.592    -.1119975    .1960007
      sdap_3 |   .1197871   .0836435     1.43   0.153    -.0447639    .2843381
      sdap_4 |  -.0679538    .102135    -0.67   0.506     -.268883    .1329755
      sdap_5 |   .0603735   .0741692     0.81   0.416    -.0855389    .2062859
      sdap_6 |   .1025111   .0761498     1.35   0.179    -.0472976    .2523199
       _cons |   .0088486   .0769664     0.11   0.909    -.1425666    .1602638
-------------+----------------------------------------------------------------
     sigma_u |  .16277688
     sigma_e |  .18455575
         rho |  .43754238   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0:     F(166, 325) =     1.44                 Prob > F = 0.0030
```

xi: xtreg gct i.fy DI CI MSG SEA MOSother female Native Asian black pacisl race_na hispanic sdap_1 sdap_2 sdap_3 sdap_4 sdap_5 sdap_6, fe

```
i.fy              _Ify_2005-2012     (naturally coded; _Ify_2005 omitted)
note: DI omitted because of collinearity
note: CI omitted because of collinearity
note: MSG omitted because of collinearity
note: SEA omitted because of collinearity
note: MOSother omitted because of collinearity
note: sdap_1 omitted because of collinearity

Fixed-effects (within) regression               Number of obs      =       483
Group variable: BMOS_1                          Number of groups   =       163

R-sq:  within  = 0.1247                         Obs per group: min =         1
       between = 0.2394                                        avg =       3.0
       overall = 0.2004                                        max =         8

                                                F(19,301)          =      2.26
corr(u_i, Xb)  = 0.1528                         Prob > F           =    0.0023
```

gct	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
_Ify_2006	-2.123814	1.615818	-1.31	0.190	-5.303545	1.055917
_Ify_2007	-.9068893	1.731916	-0.52	0.601	-4.315086	2.501307
_Ify_2008	-1.68645	1.633291	-1.03	0.303	-4.900565	1.527665
_Ify_2009	-1.234	1.67833	-0.74	0.463	-4.536746	2.068745
_Ify_2010	-2.777325	1.664162	-1.67	0.096	-6.052191	.4975403
_Ify_2011	-2.971972	1.676726	-1.77	0.077	-6.271562	.3276175
_Ify_2012	-1.43807	1.725789	-0.83	0.405	-4.834209	1.95807
DI	(omitted)					
CI	(omitted)					
MSG	(omitted)					
SEA	(omitted)					
MOSother	(omitted)					
female	-4.58157	2.147348	-2.13	0.034	-8.807287	-.3558539
Native	-1.729553	6.903374	-0.25	0.802	-15.31454	11.85543
Asian	-1.370873	4.028219	-0.34	0.734	-9.29791	6.556165
black	-9.850724	1.866472	-5.28	0.000	-13.52371	-6.177738
pacisl	-8.299588	5.380125	-1.54	0.124	-18.88701	2.287834
race_na	.3638365	4.748507	0.08	0.939	-8.980639	9.708312
hispanic	-3.954468	1.521314	-2.60	0.010	-6.948227	-.9607094
sdap_1	(omitted)					
sdap_2	.522886	2.91933	0.18	0.858	-5.221996	6.267768
sdap_3	-2.702347	3.080266	-0.88	0.381	-8.76393	3.359235
sdap_4	.4129958	4.223292	0.10	0.922	-7.897922	8.723914
sdap_5	.6575311	2.822597	0.23	0.816	-4.896991	6.212053
sdap_6	-.8471261	2.915426	-0.29	0.772	-6.584325	4.890073
_cons	114.4577	2.873016	39.84	0.000	108.804	120.1115
sigma_u	7.8114022					
sigma_e	6.5109271					
rho	.59005802	(fraction of variance due to u_i)				

```
F test that all u_i=0:     F(162, 301) =     2.62            Prob > F = 0.0000
```

xi: xtreg proficiency i.fy DI CI MSG SEA MOSother female Native Asian black pacisl race_na hispanic sdap_1 sdap_2 sdap_3 sdap_4 sdap_5 sdap_6, fe

```
i.fy              _Ify_2005-2012      (naturally coded; _Ify_2005 omitted)
note: DI omitted because of collinearity
note: CI omitted because of collinearity
note: MSG omitted because of collinearity
note: SEA omitted because of collinearity
note: MOSother omitted because of collinearity
note: sdap_1 omitted because of collinearity

Fixed-effects (within) regression               Number of obs      =       511
Group variable: BMOS_1                          Number of groups   =       167

R-sq:  within  = 0.1301                         Obs per group: min =         1
       between = 0.0505                                        avg =       3.1
       overall = 0.0790                                        max =         8

                                                F(19,325)          =      2.56
corr(u_i, Xb)  = -0.1499                        Prob > F           =    0.0004
```

proficiency	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
_Ify_2006	-.0168269	.021258	-0.79	0.429	-.0586475	.0249937
_Ify_2007	.025938	.022881	1.13	0.258	-.0190755	.0709514
_Ify_2008	-.0190656	.0217679	-0.88	0.382	-.0618894	.0237582
_Ify_2009	-.0319525	.0223493	-1.43	0.154	-.0759199	.012015
_Ify_2010	-.0392856	.0220037	-1.79	0.075	-.0825732	.004002
_Ify_2011	-.0455976	.0221725	-2.06	0.041	-.0892174	-.0019779
_Ify_2012	-.0348638	.0228088	-1.53	0.127	-.0797353	.0100077
DI	(omitted)					
CI	(omitted)					
MSG	(omitted)					
SEA	(omitted)					
MOSother	(omitted)					
female	-.0045064	.0283993	-0.16	0.874	-.0603761	.0513633
Native	-.1080686	.0692792	-1.56	0.120	-.2443608	.0282236
Asian	.0167019	.0547162	0.31	0.760	-.0909407	.1243445
black	-.0592486	.0226021	-2.62	0.009	-.1037135	-.0147836
pacisl	-.079131	.0736488	-1.07	0.283	-.2240195	.0657575
race_na	.0287831	.0582232	0.49	0.621	-.0857588	.1433249
hispanic	-.0224247	.0200295	-1.12	0.264	-.0618286	.0169792
sdap_1	(omitted)					
sdap_2	.0925144	.0381071	2.43	0.016	.0175466	.1674821
sdap_3	.1075303	.0407182	2.64	0.009	.0274258	.1876348
sdap_4	.1865271	.04972	3.75	0.000	.0887135	.2843408
sdap_5	.1391051	.0361061	3.85	0.000	.0680741	.2101362
sdap_6	.082916	.0370702	2.24	0.026	.0099882	.1558439
_cons	4.502655	.0374677	120.17	0.000	4.428945	4.576365
sigma_u	.08875756					
sigma_e	.08984293					
rho	.49392315	(fraction of variance due to u_i)				

```
F test that all u_i=0:     F(166, 325) =     1.91           Prob > F = 0.0000
```

xi: xtreg conduct i.fy DI CI MSG SEA MOSother female Native Asian black pacisl race_na hispanic sdap_1 sdap_2 sdap_3 sdap_4 sdap_5 sdap_6, fe

```
i.fy              _Ify_2005-2012      (naturally coded; _Ify_2005 omitted)
note: DI omitted because of collinearity
note: CI omitted because of collinearity
note: MSG omitted because of collinearity
note: SEA omitted because of collinearity
note: MOSother omitted because of collinearity
note: sdap_1 omitted because of collinearity

Fixed-effects (within) regression               Number of obs      =       511
Group variable: BMOS_1                          Number of groups   =       167

R-sq:  within  = 0.0824                         Obs per group: min =         1
       between = 0.0294                                        avg =       3.1
       overall = 0.0535                                        max =         8

                                                F(19,325)          =      1.54
corr(u_i, Xb)  = -0.1172                        Prob > F           =    0.0716
```

conduct	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
_Ify_2006	-.0131701	.0276037	-0.48	0.634	-.0674745	.0411343
_Ify_2007	.0327586	.0297111	1.10	0.271	-.0256918	.0912091
_Ify_2008	-.0282004	.0282658	-1.00	0.319	-.0838075	.0274068
_Ify_2009	-.0314022	.0290207	-1.08	0.280	-.0884944	.02569
_Ify_2010	-.0360197	.028572	-1.26	0.208	-.092229	.0201896
_Ify_2011	-.0413341	.0287912	-1.44	0.152	-.0979748	.0153066
_Ify_2012	-.0275831	.0296174	-0.93	0.352	-.0858491	.030683
DI	(omitted)					
CI	(omitted)					
MSG	(omitted)					
SEA	(omitted)					
MOSother	(omitted)					
female	-.0286587	.0368768	-0.78	0.438	-.101206	.0438886
Native	-.0688273	.0899596	-0.77	0.445	-.2458039	.1081494
Asian	.0772796	.0710495	1.09	0.278	-.0624953	.2170545
black	-.0290791	.0293491	-0.99	0.323	-.0868173	.028659
pacisl	-.0207519	.0956336	-0.22	0.828	-.2088909	.1673871
race_na	.0581609	.0756033	0.77	0.442	-.0905728	.2068945
hispanic	-.0236241	.0260085	-0.91	0.364	-.0747905	.0275422
sdap_1	(omitted)					
sdap_2	.1287524	.0494824	2.60	0.010	.0314061	.2260987
sdap_3	.1743632	.0528729	3.30	0.001	.0703468	.2783796
sdap_4	.1972359	.0645619	3.05	0.002	.0702239	.3242478
sdap_5	.184566	.046884	3.94	0.000	.0923314	.2768005
sdap_6	.1354539	.048136	2.81	0.005	.0407564	.2301514
_cons	4.446656	.0486522	91.40	0.000	4.350943	4.542369
sigma_u	.10509027					
sigma_e	.11666188					
rho	.44795907	(fraction of variance due to u_i)				

```
F test that all u_i=0:     F(166, 325) =     1.63           Prob > F = 0.0001
```

xi: xtreg pft i.fy DI CI MSG SEA MOSother female Native Asian black pacisl race_na hispanic sdap_1 sdap_2 sdap_3 sdap_4 sdap_5 sdap_6, fe

```
i.fy              _Ify_2005-2012      (naturally coded; _Ify_2005 omitted)
note: _Ify_2006 omitted because of collinearity
note: _Ify_2007 omitted because of collinearity
note: _Ify_2008 omitted because of collinearity
note: _Ify_2009 omitted because of collinearity
note: _Ify_2011 omitted because of collinearity
note: DI omitted because of collinearity
note: CI omitted because of collinearity
note: MSG omitted because of collinearity
note: SEA omitted because of collinearity
note: MOSother omitted because of collinearity
note: sdap_4 omitted because of collinearity

Fixed-effects (within) regression               Number of obs      =       206
Group variable: BMOS_1                          Number of groups   =       113

R-sq:  within  = 0.4869                         Obs per group: min =         1
       between = 0.0589                                        avg =       1.8
       overall = 0.1137                                        max =         3

                                                F(14,79)           =      5.35
corr(u_i, Xb)  = -0.7269                        Prob > F           =    0.0000
```

pft	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
_Ify_2006	(omitted)					
_Ify_2007	(omitted)					
_Ify_2008	(omitted)					
_Ify_2009	(omitted)					
_Ify_2010	-4.118183	3.203288	-1.29	0.202	-10.49417	2.257802
_Ify_2011	(omitted)					
_Ify_2012	2.959401	3.775413	0.78	0.435	-4.55537	10.47417
DI	(omitted)					
CI	(omitted)					
MSG	(omitted)					
SEA	(omitted)					
MOSother	(omitted)					
female	-14.01252	8.778291	-1.60	0.114	-31.48527	3.460232
Native	9.141458	19.87558	0.46	0.647	-30.4199	48.70282
Asian	37.03533	17.25466	2.15	0.035	2.690792	71.37987
black	35.64969	9.207589	3.87	0.000	17.32245	53.97694
pacisl	33.46683	23.58634	1.42	0.160	-13.48061	80.41426
race_na	-31.89031	33.6388	-0.95	0.346	-98.84668	35.06605
hispanic	32.47836	7.496247	4.33	0.000	17.55745	47.39926
sdap_1	154.1064	143.0345	1.08	0.285	-130.5967	438.8094
sdap_2	160.6218	143.0398	1.12	0.265	-124.0918	445.3355
sdap_3	151.0623	141.722	1.07	0.290	-131.0283	433.1529
sdap_4	(omitted)					
sdap_5	160.5877	141.928	1.13	0.261	-121.913	443.0883
sdap_6	128.1777	141.6176	0.91	0.368	-153.7051	410.0605
_cons	104.3557	137.1709	0.76	0.449	-168.6761	377.3874
sigma_u	34.402256					
sigma_e	15.485926					
rho	.83151197	(fraction of variance due to u_i)				

```
F test that all u_i=0:     F(112, 79) =     2.79                 Prob > F = 0.0000
```

xi: xtreg cft i.fy DI CI MSG SEA MOSother female Native Asian black pacisl race_na hispanic sdap_1 sdap_2 sdap_3 sdap_4 sdap_5 sdap_6, fe

```
i.fy              _Ify_2005-2012      (naturally coded; _Ify_2005 omitted)
note: _Ify_2006 omitted because of collinearity
note: _Ify_2007 omitted because of collinearity
note: _Ify_2008 omitted because of collinearity
note: _Ify_2012 omitted because of collinearity
note: DI omitted because of collinearity
note: CI omitted because of collinearity
note: MSG omitted because of collinearity
note: SEA omitted because of collinearity
note: MOSother omitted because of collinearity
note: sdap_4 omitted because of collinearity

Fixed-effects (within) regression               Number of obs      =       230
Group variable: BMOS_1                          Number of groups   =       114

R-sq:  within  = 0.3725                         Obs per group: min =         1
       between = 0.0520                                        avg =       2.0
       overall = 0.1169                                        max =         4

                                                F(15,101)          =      4.00
corr(u_i, Xb)  = -0.2867                        Prob > F           =    0.0000
```

cft	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
_Ify_2006	(omitted)					
_Ify_2007	(omitted)					
_Ify_2008	(omitted)					
_Ify_2009	-11.83356	2.954989	-4.00	0.000	-17.69546	-5.971652
_Ify_2010	-9.517955	2.248534	-4.23	0.000	-13.97844	-5.057469
_Ify_2011	-2.81632	2.30971	-1.22	0.226	-7.398163	1.765522
_Ify_2012	(omitted)					
DI	(omitted)					
CI	(omitted)					
MSG	(omitted)					
SEA	(omitted)					
MOSother	(omitted)					
female	2.47801	5.640027	0.44	0.661	-8.710286	13.66631
Native	-5.609299	12.23736	-0.46	0.648	-29.88492	18.66632
Asian	-13.4562	9.423884	-1.43	0.156	-32.15065	5.238249
black	-2.435873	5.404263	-0.45	0.653	-13.15648	8.284731
pacisl	61.47019	14.4631	4.25	0.000	32.77929	90.16109
race_na	-1.281117	20.53246	-0.06	0.950	-42.012	39.44977
hispanic	-.7571268	4.447913	-0.17	0.865	-9.58059	8.066336
sdap_1	16.18476	76.94566	0.21	0.834	-136.4547	168.8243
sdap_2	21.75789	76.84845	0.28	0.778	-130.6888	174.2046
sdap_3	18.87046	76.33019	0.25	0.805	-132.5481	170.289
sdap_4	(omitted)					
sdap_5	22.58843	76.40616	0.30	0.768	-128.9808	174.1577
sdap_6	25.5449	76.32687	0.33	0.739	-125.8671	176.9569
_cons	267.9096	73.71028	3.63	0.000	121.6883	414.131
sigma_u	11.424436					
sigma_e	9.6497164					
rho	.58362006	(fraction of variance due to u_i)				

```
F test that all u_i=0:     F(113, 101) =     1.49                 Prob > F = 0.0200
```

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